



SDMS DocID 0002

SDM5-# 23085

SUPPLEMENTAL PRE-DESIGN INVESTIGATION
OF THE ARSENIC PIT
AND CHROMIUM LAGOONS

INDUSTRI-PLEX SITE WOBURN, MASSACHUSETTS

Prepared for:

Industri-Plex Site Remedial Trust 800 North Lindbergh Boulevard St. Louis, Missouri

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August 1991

893-6255

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ow-43	DIS. As (996)	Dis Cr	/ P.H	(Avavst)	1991) 000	NH3
0 W- 44	< 4.2	< 4.3	6,4 5 .3	16.6	51.7	1.2" 2.0
ow-45	999.0	< 4.3	7.7	32./	91.8	37
0w-46	64.8	5./	6.8	9.6	31.6	5.6
O W-47	338	44,3	6.5	17	50	10
0 w-9	12.7	44.3	7.38 (7.6)	14.1(38)	(62,1)(129)	42
0 W-48A	657	< 4.3	6.4	17.4	50.3	10
0w-48	54.2	5, 5	5.8	9	2/10	2,4
OW-49A	61,3	44,3	6.4	10,1	22,9	25
0 W-49	35,8 10.8	44,3 4 4.3	6.6	3.8 8.9	10.4	1.9 17
οω- <i>50</i>	126	11.5	5.7	21	86	33
AB1-WO	4.0	~4.3	6.0	7.2	16.5	8.4
0w-18	2.3	£4.3	6.0	6.1	11	22
0 w-12	572	-	7.15 7.15	(29) <i>33</i>	(144) 97	2.7
ow-14	35		5.85	(5.1) (7.55)	(20) (17)	1.1
o w-17	164		7.0/	(160) (313)	(454) (1030)	280
0 W- 18	• • • • • • • • • • • • • • • • • • •		5.6	(5.1) (6.1)	(420) (11)	22
0 w-18A 0 w-22			6.2	(5,5) (7,25)	52.3 (4.5)	8.4
0 w-37 0 w-38 0w-42		(ow 3 (ow 4 (ow 4 (ow 4	7)-6.09 18:-5.78	(11.5) (11.5) (7.3) (9.6) 8.5	(24) (35) (24.4) (40) (16.4)	5.4
			· +./	34	77000	+ 300)



August 2, 1991

Project No.: 893-6255

United States Environmental Protection Agency, Region I J.F.K. Federal Building HRS-CAN-3 Boston, Massachusetts 02203-2211

Attn: Mr. Joseph DeCola

Remedial Project Manager

RE: SUPPLEMENTAL PRE-DESIGN INVESTIGATION ARSENIC PIT AND

CHROMIUM LAGOONS, INDUSTRI-PLEX SITE

Gentlemen:

On behalf of the Industri-Plex Site Remedial Trust, we are submitting the attached Supplemental Pre-Design Investigation of the Arsenic Pit and Chromium Lagoons at the Industri-Plex Site in Woburn, Massachusetts. This report describes a program of monitoring well installation, groundwater sampling, and laboratory analysis conducted in accordance with the Work Plan previously submitted to the Agencies.

Very truly yours,

GOLDER ASSOCIATES INC.

P. Stephen Finn, C. Eng.

Project Manager

PSF/bjt C:ARSCL

cc: W. Smull, ISRT

J. Naparstek, MDEP

A. Ostrofsky, NUS

D. Baumgartner, ISRT

TABLE OF CONTENTS

SECT1	ON		PAGE
Cover	Let	ter	i
Table	e of (Contents	ii
1.0	INTRO	DDUCTION	1
2.0	2.1	OD OF INVESTIGATION Monitoring Well Installation Groundwater Sampling and Analysis	2 2 4
3.0	RESU	LTS	6
4.0		USSION Dissolved Arsenic 4.1.1 Monitoring Wells in the Vicinity of the Arsenic Pit	7 7 7
		4.1.2 Monitoring Wells in the Vicinity of the Chromium Lagoons Dissolved Chromium Other Dissolved Metals	7 8 9
5.0	SUMMA	ARY	11
6.0	REFE	RENCES	12
LIST	OF T	ABLES	In Order Following
Table Table	2 - 2 3 - 2 4 -	Well Construction and Borehole Data Water Level Measurements, Industri-Plex Site, 4/17/91-4/19/91 Qualified Data for Dissolved Metals Qualified Data for Total Metals Qualified Data for General Water Quality Parameters	Page 12.

LIST OF FIGURES

Figure 1 - Monitoring Well Location Map Figure 2 - Cross Sections

TABLE OF CONTENTS (continued)

LIST OF APPENDICES

Appendix A - Technical Procedures

Appendix B - Soil Boring Logs

Appendix C - Monitoring Well Construction Diagrams Appendix D - Well Development Forms

Appendix E - Chain of Custody Forms

Appendix F - CLP Data Validation Narrative

Appendix G - Non-CLP Data Assessment

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1.0 INTRODUCTION

A hydrogeologic investigation was performed in order to assess if the Arsenic Pit and Chromium Lagoons are influencing the mobility of selected trace metals in groundwater. The investigation included the installation of eleven new monitoring wells, water level measurements in existing monitoring wells, and groundwater sampling/analysis for monitoring wells near the Arsenic Pit and Chromium Lagoons as approved in the Work Plan (Golder Associates Inc., 1991a). The investigation was performed in accordance with the procedures presented in the Work Plan (Golder Associates Inc., 1991a).

This report presents a description of the hydrogeologic investigation, including the methods used and results obtained, along with an evaluation of the potential influence of the Arsenic Pit and the Chromium Lagoons on the mobility of selected trace metals. A revised monitoring well location map and cross-sections showing the concentrations of dissolved arsenic and chromium in samples from the vicinity of the Arsenic Pit and Chromium Lagoons are also included. Appendices to this report contain supporting documentation including borehole logs, well construction logs, and data validation/assessment records.

2.0 METHOD OF INVESTIGATION

2.1 Monitoring Well Installation

Eleven new monitoring wells were installed during this investigation. The locations are shown on Figure 1 and are designated OW-43, OW-44, OW-45, OW-46, OW-47, OW-48, OW-48A, OW-49, OW-49A, OW-50, and OW-50A. Shallow/deep well pairs were installed in the unconsolidated aquifer at locations OW-48, OW-49, and OW-50 south of the Chromium Lagoons. The shallow wells are designated by the suffix "A".

Drilling was performed in accordance with the Technical Procedures given in Appendix A. The monitoring wells were installed using hollow stem auger drilling equipment which was steam cleaned prior to use at each borehole. Split spoon samples were taken every five feet ahead of the augers. All split spoon samples were logged by a Golder geologist, and representative samples were placed in labeled jars and retained for reference. Running sands, which were encountered during drilling, were controlled by adding City of Woburn water to the borehole. The boreholes were advanced to auger refusal, and the monitoring wells were constructed through the hollow stem of the augers.

The saturated thickness of the unconsolidated aquifer was determined during drilling by а Golder Associates saturated thickness of qeologist. When the unconsolidated aquifer exceeded 30 feet, two wells were installed, in accordance with the Work Plan. wells were installed, one well was screened near the top of the unconsolidated aquifer, and the second at the base of the unconsolidated aquifer. At locations where a single well was installed, the screen was located in the most permeable zone based on visual estimation of the aquifer gradation as determined from split spoon samples.

boring logs and well construction diagrams are given in Appendices B and C, respectively, and summarized in Table 1.

The monitoring wells were constructed of four-inch diameter Schedule 40 PVC with 0.010-inch factory slotted screen, and four-inch diameter Schedule 40 PVC flush-threaded casing. The well screen was 10 feet in length, except where the saturated thickness of the unconsolidated aquifer was less than twelve feet (OW-43, OW-46 and OW-47) where a five-foot screen was installed. A sand pack of number 20 Ottawa sand was placed around the screens, and extended above the screen a distance of at least two feet. bentonite pellets/chips was placed above the sand pack to prevent grout from entering the sand pack. Bentonite grout was then placed in the annular space to approximately two feet below ground surface using the tremie method. A sixinch diameter, five-foot long, steel protective casing was fitted over the well, and set in concrete. The protective casing was secured with a locking lid, and both lid and casing were marked with the well designation.

The top of the PVC casing was notched to provide a consistent measuring point, and the elevation and horizontal coordinates of this point were surveyed by a surveyor licensed in the Commonwealth of Massachusetts. The survey data are summarized in Table 1. A revised monitoring well location map for the Site is given in Figure 1.

The monitoring wells were developed using a submersible pump, a centrifugal pump, or a Waterra foot valve pump as appropriate to the recovery rate of the well. A new piece of polypropylene tubing was used during development of each well. At a minimum, a volume of water equal to that which

was introduced during drilling, or three casing volumes (whichever was greater), was removed during development. In accordance with the Work Plan, the wells were developed until they were as free and clear of sediment as possible, and field parameters (pH and conductivity) had stabilized. Well development documentation is included in Appendix D.

August 1991

A complete round of synoptic water level measurements was taken for on-Site monitoring wells after all the wells were developed. These data are summarized on Table 2.

All groundwater removed during development was collected in a 250-gallon truck-mounted tank and transported to the holding tanks at the decontamination pad for temporary storage. In accordance with the Work Plan, all soil cuttings from drilling operations conducted outside of the fenced area of the Site were transported back to the decontamination pad and placed in a designated on-Site area.

All field activities were performed in accordance with the Golder Associates Inc. Health and Safety Plan included in the Work Plan. During drilling, ambient air quality was monitored by the Site Health and Safety Officer, or his appointed representative.

2.2 Groundwater Sampling and Analysis

Sampling of the eleven new monitoring wells, as well as eleven previously installed wells (OW-9, OW-12, OW-14, OW-17, OW-18, OW-18A, OW-22, OW-37, OW-38, OW-40, and OW-42), was performed between April 11 and April 18, 1991. Ground water samples were collected in accordance with the Work Plan Technical Procedures which are included as Appendix A. Prior to sampling, the depth to water in each well was measured. All wells were purged by removing a minimum of

three casing volumes of water prior to sampling. Samples were collected using disposable Teflon bailers and laboratory-supplied sample bottles which were labeled with a unique sample identification number.

Samples were collected for Contract Laboratory Program-Routine Analytical Services (CLP-RAS) total and dissolved Target Analyte List (TAL) metals analyses. collected for total metals were placed in 500 milliliter (ml) polyethylene bottles and preserved with nitric acid. Samples collected for dissolved metals were filtered in the field using disposable 0.45-micron filters. The filtered samples were then placed in 500 ml polyethylene bottles and preserved with nitric acid. Samples were also collected for total organic carbon (TOC, EPA Method 415.1), chemical oxygen demand (COD, Hach Method 8000, 40 CFR 136), and total dissolved solids (TDS, EPA Method 160.1) analyses. Temperature, conductivity, pH, and redox potential (Eh) were measured in the field. The above suite of analyses was specified in the Work Plan. Although not required by the Work Plan, samples were also collected for ammonia and total Kjeldahl nitrogen analyses (by EPA Methods 350.2/350.3 and 351.3, respectively).

Quality Assurance/Quality Control samples included two (at OW-46 field duplicates and OW-49), two spike/matrix spike duplicates (at OW-18A and OW-48A), and two equipment rinsate blanks. Samples were maintained under Chain-of-Custody procedures given in the Quality Assurance Project Plan (QAPjP, Golder Associates Inc., 1989) and shipped to Environmental Testing and Certification (ETC) by overnight courier. Copies of the Chain-of-Custody forms are given in Appendix E.

3.0 RESULTS

The locations of the new monitoring wells, as well as preexisting wells which were installed as part of the Remedial Investigation (Stauffer Chemical Company, 1984), the Pre-Design Investigation (Golder Associates Inc., 1991b), and the Ground-Water/Surface Water Investigation Plan Phase I Remedial Investigation (Roux Associates Inc., 1991), are shown on Figure 1. Borehole and well construction data are given in Table 1, and water-level measurements are given in Table 2.

The CLP-RAS data packages were validated in accordance with USEPA Region I guidelines (USEPA, 1989). The CLP data validation narrative is given in Appendix F. The non-CLP data were assessed in accordance with guidelines given in the QAPjP (Golder Associates Inc., 1989). This assessment is documented in Appendix G. The qualified analytical data are summarized in Tables 3 through 5 for dissolved TAL metals, total TAL metals, and general water quality parameters, respectively.

Overall, the data are considered useable for the purposes of this task. Although much of the data for detected analytes are qualified as estimated (J), they still show the relative concentrations for various monitoring points such that concentration patterns can be discerned.

4.0 DISCUSSION

4.1 Dissolved Arsenic

4.1.1 Monitoring Wells in the Vicinity of the Arsenic Pit The analytical results for dissolved arsenic in filtered groundwater samples collected in monitoring wells located in the vicinity of the Arsenic Pit are shown on Figure 2. The filtered groundwater sample from OW-43, which is located immediately downgradient of the Arsenic Pit, had a dissolved arsenic concentration of 60.1 ppb, but dissolved (<4.2 ppb) in the arsenic was not detected filtered OW-44 which groundwater sample is located from approximately eighty-five feet downgradient from OW-43. The filtered groundwater sample from OW-45, which is OW-44. dissolved located south of had arsenic а concentration of 999 ppb. The filtered groundwater sample from OW-46, located south of OW-45, contained 64.8 ppb dissolved arsenic.

If the dissolved arsenic detected in the filtered sample from OW-45 was related to the Arsenic Pit, the dissolved arsenic concentrations in filtered samples from OW-43 and OW-44 would be expected to be greater than the 999 ppb concentration detected in OW-45, because OW-43 and OW-44 are located closer to the Arsenic Pit. Therefore, based upon the data shown on Figure 2, it does not appear that the Arsenic Pit is affecting the mobility of dissolved arsenic in the unconsolidated aguifer to any greater extent than the surrounding areas.

4.1.2 Monitoring Wells in the Vicinity of the Chromium Lagoons

The analytical results for dissolved arsenic in filtered groundwater samples collected in the vicinity of the Chromium Lagoons are shown on Figure 2. The filtered groundwater sample from OW-47, which is located approximately 200 feet upgradient of the Chromium Lagoons,

contained 338 ppb dissolved arsenic. The concentration of dissolved arsenic was 657 ppb in the filtered groundwater sample collected from OW-48A, which is located approximately 50 feet downgradient of the Chromium Lagoons. OW-48A is screened in the upper part of the unconsolidated aquifer. The concentration of dissolved arsenic in the filtered groundwater sample from OW-48, which is screened in the lower part of the unconsolidated aquifer, was only 54.2 ppb.

If the Chromium Lagoons were affecting the mobility of dissolved arsenic in the unconsolidated aquifer, the concentration of dissolved arsenic would be expected to be greater in OW-48A than in OW-48 and OW-47. Such a pattern is present in the Site data for dissolved arsenic. Therefore, it appears that the Chromium Lagoons might be influencing the mobility of arsenic in the unconsolidated However, it should noted be that concentration of dissolved arsenic detected in the filtered groundwater sample from OW-48A is not greater than the concentrations of dissolved arsenic detected in filtered samples from surrounding areas in the groundwater unconsolidated aquifer.

4.2 Dissolved Chromium

The analytical results for dissolved chromium in filtered groundwater samples collected from monitoring wells in the vicinity of the Arsenic Pit and Chromium Lagoons are shown on Figure 2. The concentration of dissolved chromium was less than 50 ppb for all 22 filtered groundwater samples collected during this task, and was below the detection limit for 11 of the samples. Therefore, the Arsenic Pit and the Chromium Lagoons do not appear to be affecting the mobility of dissolved chromium in the unconsolidated aquifer to any greater extent than the surrounding areas.

4.3 Other Dissolved Metals

The concentrations of other dissolved TAL metals in the filtered groundwater samples are given in Table Dissolved lead was detected in the filtered sample from OW-22 at a concentration of 286 ppb. Dissolved lead was not detected in previous filtered samples collected from OW-22 on March 21, 1990, and October 17, 1990. The concentration of dissolved lead in filtered groundwater samples from all other monitoring wells was less than 50 ppb. The Chromium Lagoons do not appear to be affecting the mobility of dissolved lead in the unconsolidated aquifer to a greater extent than the surrounding areas because OW-22 is not located downgradient of the Chromium Lagoons. The Arsenic Pit does not appear to be affecting the mobility of dissolved lead in the unconsolidated aguifer to a greater extent than the surrounding areas because the dissolved lead concentration in the filtered groundwater sample from OW-43, which is located closer to the Arsenic Pit than OW-22, is lower than that in OW-22.

Dissolved selenium was detected in the filtered groundwater sample from OW-40 at a concentration of 187 ppb. OW-40 is downgradient of the Chromium Lagoons. concentration of dissolved selenium is lower in the filtered groundwater sample from OW-43, which is closer to the Arsenic Pit than OW-40. The concentration of dissolved selenium was less than 10 ppb in all other filtered samples Therefore, the Arsenic Pit and collected in April 1991. the Chromium Lagoons are probably not affecting the selenium in the mobility of dissolved unconsolidated aguifer to any greater extent than the surrounding areas.

Dissolved cadmium was detected in filtered groundwater samples at concentrations greater than 10 ppb at adjacent locations OW-18 (26.0 ppb), OW-18A (17.2 ppb), and OW-50 ppb). These three adjacent locations downgradient of the Chromium Lagoons. However, the concentration of dissolved cadmium in filtered groundwater samples from monitoring wells OW-48A, OW-48A, OW-49A, and OW-49, which are closer to the Chromium Lagoons, was less than 4.9 ppb. Therefore, the Arsenic Pit and the Chromium Lagoons do not appear to be affecting the mobility of dissolved cadmium in the unconsolidated aquifer to any greater extent than the surrounding areas.

5.0 SUMMARY

Eleven new monitoring wells were installed downgradient from the Arsenic Pit and the Chromium Lagoons. Groundwater samples were collected from selected monitoring wells and analyzed for total and dissolved TAL metals, as well as several general water quality parameters. A complete round of synoptic water level measurements was recorded.

The Arsenic Pit does not appear to be influencing the mobility of selected trace metals in the unconsolidated aquifer to any greater extent than the surrounding areas. Based upon the concentrations of dissolved arsenic detected in filtered groundwater samples adjacent to the Chromium Lagoons, it appears that the Chromium Lagoons might be influencing the mobility of arsenic in the unconsolidated aquifer. The Chromium Lagoons do not appear to be affecting the mobility of other TAL trace metals in the unconsolidated aquifer to a greater extent than the surrounding areas.

6.0 REFERENCES

- Golder Associates Inc., 1989. <u>Quality Assurance Project Plan</u>, Pre-Design Investigation, Industri-Plex Site, Woburn, MA, December.
- Golder Associates Inc., 1991a. Work Plan, Supplemental Pre-Design Investigation of the Arsenic Pit and Chromium Lagoons, Industri-Plex Site, Woburn, MA, March.
- Golder Associates Inc., 1991b. <u>Pre-Design Investigation</u>
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 Industri-Plex Site, Woburn, MA, March.
- Roux Associates Inc., 1991. <u>Ground-Water/Surface Water Investigation Plan, Phase 1 Remedial Investigation, Final Report</u>, prepared for Industri-Plex Site Remedial Trust, Woburn, MA.
- Stauffer Chemical Company, 1984. <u>Woburn Environmental</u>
 <u>Studies, Phase 2 Report</u>, Industri-Plex Site, Woburn,
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- U.S. Environmental Protection Agency, 1989. <u>Laboratory</u>
 <u>Data Validation Functional Guidelines for Evaluating Inorganics Analyses</u>, USEPA Region 1, February.

C:AUG91RPT:ARS8-1F

57.33

76.28

90.72

15.04

0.00

2.53

40.72

5.04

to

to

90.72

15.04

overburden

overburden

WELL/		COORD	MATES	(FT, MSL) GROUND	WELL DIAMETER/	TOTAL DEPTH OF WELL	(FT, MSL) ELEV.	STICKUP (FT ABOVE		REEN		
BOREHOLE	· ·			SURFACE	WELL	(FT BELOW	OF	LAND	,	r BELC		
NUMBER	PROGRAM	NORTHING	EASTING	ELEV.	MATERIAL	LAND SURFACE)	PVC/MP	SURFACE)	LANE	SURF	FACE)	FORMATIO
OW-1	RI/FS	554602.90	697441.20	* 79.2	! 6" steel	108.03	80.32	0.89	24.03	to	108.03	bedrock
OW-1A	RI/FS	554529.40	697382.40	• • •		24.32	79.72	0.51	4.32	to	24.32	overburde
OW-2	RI/FS	554837.81	696878.17					•••		•••		
OW-4	RI/FS	553992.00	698514.70	* 70.6	6" steel	42.76	71.54	0.96	22.76	to	42.76	bedrock
OW-6	RI/FS	549367.60	699764.70	* 62.7	4" PVC	16.85	67.70	0.00	6.85	to	16.85	overburde
OW-7	RI/FS	548941.20	698323.50	* 57.2	2 4" PVC	31.49	57.88	0.65	1.49	to	31.49	overburde
OW-9	RI/FS	552647.10	696250.00	* 67.3	6" steel	127.31	68.88	1.63	32.31	to	127.31	bedrock
OW-10	RI/FS	552699.15	695361.10	63.8	3 4" PVC	31.42	64.83	0.80	1.42	to	31.42	overburde
OW-11	RI/FS	553639.34	695131.17	70.0	4" PVC	41.11	71,21	1.21	1.11	to	41.11	overburde
OW-12	RI/FS	552234.19	696621.33	62.6	6 4" PVC	50.67	63.74	1.08	10.67	to	50.67	overburde
OW-13	RI/FS	552578.45	697361.10	65.0	4" PVC	32.15	64.99	0.00	7.15	to	32.15	overburde
OW-14	RI/FS	552647.10	696117.60	* 64.4	4" PVC	47.39	65.54	1,11	2.39	to	47.39	overburde
OW-15	RI/FS	553514.70	698764.70	* 64.1	6" steel	25.82	64.60	0.49	5.82	to	25.82	overburde
OW-16	RI/FS	553529.40	697205.90	* 66.1	4" PVC	66.10	67.29	1.15	15.83	to	35.83	overburde
OW-17	RI/FS	551617.60	696676.50	* 56.8	3 4" PVC	25.27	57.86	1.05	5.27	to	25.27	overburde
OW-18	RI/FS	551764.70	696367.60	• 62.5	6" PVC	55.15	62.76	0.31	15.15	to	55.15	overburde
OW-18A	RI/FS		696426.50			15.20	62.08	0.77	5.20	to	15.20	overburde
OW-19	GSIP	550441.20	697294.10	* 54.4	6" PVC	67.00	55.97	1.54	37.00	to	67.00	overburde

PDI

PDI

548955.90 697676.50 *

554959.32 696057.48

57.3

73.7

4" PVC

4" PVC

OW-20

OW-21

	WELL CONSTRUCTION AND BOREHOLE DATA													
WELL/		COORD	INATES	(FT, MSL) GROUND	WELL DIAMETER/	OF WELL	(FT, MSL) ELEV.	STICKUP (FT ABOVE	IN	REEN	AL			
BOREHOLE NUMBER	FIELD PROGRAM	NORTHING	EASTING	SURFACE ELEV.	WELL MATERIAL	(F ! BELOW LAND SURFACE)	OF PVC/MP	LAND SURFAÇE)	•	T BELC SURF		FORMATION		
	L		L			<u></u>								
OW-22	PDI	553799.67	696447.81	78.6	2" PVC	13.52	81.80	3.12	3.52	to	13.52	overburden		
OW-23	PDI	551188.96	698054.01	66.1	4" PVC	27.00	68.54	3.00	16.85	to	27.00	overburden		
OW-24A	PDI	550703.40	697558.96	57.9	4" PVC	24.97	57.47	-0.60	14.82	to	24.97	overburden		
OW-24B	PDI	550708.99	697556.28	57.9	4" PVC	59.65	57.26	-0.50	49.50	to	59.65	overburden		
OW-25A	PDI	549263.22	697250.52	66.2	4" PVC	23.00	66.00	-0.30	12.85	to	23.00	overburden		
OW-25B	PĐI	549260.96	697238.35	66.2	4" PVC	39.42	65.34	-0.78	29.22	to	39.42	overburden		
OW-26A	PDI	550643.58	698890.86	61.4	4" PVC	23.20	64.15	1.90	13.05	to	23.20	overburden		
OW-26B	GSIP	550641.94	698883.00	61.4	4" PVC	41.46	63.80	2.30	31.31	to	41.46	overburden		
OW-27A	PDI	547732.64	697667.56	69.0	4" PVC	40.32	70.84	2.41	30.17	to	40.32	overburden		
OW-27B	PDI	547722.38	697666.92	69.0	4" PVC	94.57	70.52	1.43	84.42	to	94.57	overburden		
OW-28	PDI	554288.17	697256.05	74.5	4" PVC	8.92	77.20	2.63	3.92	to	8.92	overburden		
OW-29	PDI	548328.34	699375.14	61.6	4" PVC	25.70	61.17	-0.63	15.55	to	25.70	overburden		
OW-30A	PDI	550944.81	696591.83	63.0	4" PVC	18.72	65.90	2.00	8.57	to	18.72	overburden		
OW-30B	PDI	550941.31	696595.64	63.0	4" PVC	57.83	65.60	2.50	47.68	to	57.83	overburden		
OW-31	PDI	554644.98	695795.19	71.3	4" PVC	14.00	74.16	3.05	8.40	to	13.40	overburden		
OW-32	PDI	554558.82	696063.00	71.7	4" PVC	8.00	74.96	3.77	5.50	to	7.70	overburden		
OW-33A	PDI	549586.50	697754.51	54.5	4" PVC	44.40	56.83	2.40	34.20	to	44.40	overburden		
OW-'33B	PDI	549580.20	697752.29	54.5	4" PVC	84.01	56.66	2.30	73.86	to	84.01	overburden		
OW-36	PDI	554108.71	695680.89	72.7	4" PVC	12.90	74.86	2.16	2.90	to	12.90	overburden		
OW-37	POI	553886.80	695878.22	69.3	4" PVC	15.72	72.60	3.30	5.52	to	15.72	overburden		
OW-38	PDI _	553514.80	695611.30	69.8	4" PVC	15.50	71.40	1.60	5.30	to	15.50	overburden		

WELL CONSTRUCTION AND BOREHOLE DATA

WELL!		COORD	INATES	(FT, MSL) WELL GROUND DIAMETERV		TOTAL DEPTH OF WELL	(FT, MSL) ELEV.	STICKUP (FT ABOVE		REENED		
BOREHOLE	FIELD			SURFACE	WELL	(FT BELOW	OF	LAND	•	BELOW		
NUMBER	PROGRAM	NORTHING	EASTING	ELEV.	MATERIAL	LAND SURFACE)	PVC/MP	SURFACE)	LAND	SURFAC	;E)	FORMATION
OW-39	PDI	553211.56	697034.51	71.8	4" PVC	15.10	74,14	2.34	5.10	to	15.10	overburden
OW-40	PDI	552759.89	696441.38	68.7	4" PVC	17.00	71.64	2.94	6.80	to	17.00	overburden
OW-41	PDI	55 2685 .37	696947.98	67.5	4" PVC	16.00	66.95	-0.55	5.80	to	16.00	overburden
OW-42	PDI	551691.32	697008.81	67.0	4" PVC	34.00	69.80	2.80	23.80	to	34.00	overburden
OW-43	PDI	553983.40	696106.80	74.60	4" PVC	14.00	76.17	1.57	9.00	to	14.00	overburden
OW-44	PDI	553902.30	696123.80	69.30	4" PVC	16.50	70.60	1.30	6.50	to	16.50	overburden
OW-45	PDI	553581.50	696162.50	69.40	4" PVC	17.00	70.84	1.44	7.00	to	17.00	overburden
OW-46	PDI	553059.90	696119.20	68.20	4" PVC	13.50	67.88	-0.32	8.50	to	13.50	overburden
OW-47	PDI	552754.20	696165.30	67.80	4" PVC	16.50	69.23	1.43	11.50	to	16.50	overburden
OW-48	PDI	552337.60	696264.50	63.00	4" PVC	65.75	64.72	1.72	34.50	to	44.50	overburden
OW-48A	PDI	552334.90	696254.20	62.70	4" PVC	24.50	64.39	1.69	14.50	to	24.50	overburden
OW-49	PDI	552204.40	696305.30	64.20	4" PVC	56.00	66.06	1.86	46.00	to	56.00	overburden
OW-49A	PDI	552193.50	696308.40	65.20	4" PVC	26.00	66.42	1.22	16.00	to	26.00	overburden
OW-50	PDI	552001.10	696357.80	66.80	4" PVC	76.00	68.38	1.58	40.00	to	50.00	overburden
OW-50A	PDI	552007.00	696353.30	66.50	4" PVC	28.50	68.00	1.50	18.50	to	28.50	overburden

Note: * Locations are approximate

⁻ Not applicable

WATER LEVEL MEASUREMENTS, INDUSTRIPLEX SITE 4/17/91-4/19/91

WELL	M.P.	DEPTH TO	W.L.	WELL	M.P.	DEPTH TO	W.L.	WELL	M.P.	DEPTH TO	W.L.
NUMBER	ELEV.	WATER	ELEV.	NUMBER	ELEV.	WATER	ELEV.	NUMBER	ELEV.	WATER	ELEV.
HOMBEIT	L.L. V .	WAILI		HOMBER	<u>L.bL.</u> ▼.	WAILI	L-1 V .	HOWIDEIT	LLL.Y.	WAILH	Le Le V.
1											
OW-1	80.32	7.79	72.53	OW-20	57.33	6.49	50.84	OW-33B	56.66	5.50	51.16
OW-1A	79.72	6.73	72.99	OW-21	76.28	5.44	70.84	OW-36	74.86	5.52	69.34
OW-2	-	10.82	~	OW-22	81.80	9.00	72.80	OW-37	72.60	5.67	66.93
OW-4	71.54	6.76	64.78	OW-23	68.54	14.61	53.93	OW-38	71.40	7.56	63.84
OW-6	67.70	8.51	59.19	OW-24A	57.47	5.09	52.38	OW-39	74.14	9.41	64.73
OW-7	57.88	6.86	51.02	OW-24B	57.26	5.02	52.24	OW-40	71.64	12.09	59.55
OW-9	68.88	28.36	40.52	OW-25A	66.00	14.48	51.52	OW-41	66.95	6.25	60.70
OW-10	64.83	5.51	59.32	OW-25B	65.34	14.03	51.31	OW-42	69.80	17.10	52.70
OW-11	71.21	4.55	66.66	OW-26A	64.15	9.22	54.93	OW-43	76.17	8.61	67.56
OW-12	63.74	7.52	56.22	OW-26B	63.80	8.89	54.91	OW-44	70.60	2.94	67.66
OW-13	64.99	4.74	60.25	OW-27A	70.84	18.57	52.27	OW-45	70.84	4.89	65.95
OW-14	65.54	8.65	56.89	OW-27B	70.52	19.17	51.35	OW-46	67.88	3.68	64.20
OW-15	64.60	4.24	60.36	OW-28	77.20	11.45	65.75	OW-47	69.23	10.55	58.68
OW-16	67.29	2.70	64.59	OW-29	61.17	5.60	55.57	OW-48	64.72	8.09	56.63
OW-17	57.86	6.09	51.77	OW-30A	65.90	12.49	53.41	OW-48A	64.39	7.74	56.65
OW-18	62.76	9.09	53.67	OW-30B	65.60	12.27	53.33	OW-49	66.06	9.82	56.24
OW-18A	62.08	8.41	53.67	OW-31	74.16	4.28	69.88	OW-49A	66.42	10.35	56.07
OW-19	55.97	4.44	51.53	OW-32	74.96	4.80	70.16	OW-50	68.38	13.18	55.20
OW-19A	55.87	4.33	51.54	OW-33A	56.83	5.72	51.11	OW-50A	68.00	12.75	55.25

NOTE:

1)M.P. refers to measuring point.

2)W.L. refers to water level.

TABLE 3 Qualified Data for Dissolved Metals

Table 3

Chemical Compound Class: Dissolved Metals

QA/QC Sample: 01EQB

Aluminum, dissolved mg/l 0.2 0.095 U (0.0215) Antimony, dissolved mg/l 0.06 <0.0223 U (0.0223) Arsenic, dissolved mg/l 0.01 <0.0011 UJ (0.0011)
Arsenic, dissolved mg/l 0.01 <0.0011 UJ (0.0011)
Barium, dissolved mg/l 0.2 0.0032 U (0.0011)
Beryllium, dissolved mg/l 0.005 0.0002 U (0.00019)
Cadmium, dissolved mg/l 0.005 <0.001 U (0.001)
Calcium, dissolved mg/l 5 0.524 A (0.0183)
Chromium, dissolved mg/l 0.01 <0.0043 U (0.0043)
Cobalt, dissolved mg/l 0.05 <0.0041 U (0.0041)
Copper, dissolved mg/l 0.025 <0.0049 UJ (0.0049)
Iron, dissolved mg/l 0.1 <u>0.139</u> J (0.0068)
Lead, dissolved mg/l 0.003 <0.002 U (0.002)
Magnesium, dissolved mg/l 5 0.0911 U (0.0257)
Manganese, dissolved mg/l 0.015 0.0059 J (0.0012)
Mercury, dissolved mg/l 0.0002 0.0001 J (0.0001)
Nickel, dissolved mg/l 0.04 <0.0099 U (0.0099)
Potassium, dissolved mg/l 5 <0.135 UJ (0.135)
Selenium, dissolved mg/li 0.005 <0.0032 UJ (0.0032)
Silver, dissolved mg/l 0.01 <0.0058 U (0.0058)
Sodium, dissolved mg/l 5 0.658 U (0.07)
Thallium, dissolved mg/l 0.01 <0.0019 U (0.0019)
Vanadium, dissolved mg/l 0.05 <0.0047 U (0.0047)
Zinc, dissolved mg/l 0.02 0.0111 U (0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

QA/QC Sample: 02EQB

Chemical Parameter		CRDL	04	V 18/	91
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	< 0.0223	Ų	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0048	U	(0.0011)
Barium, dissolved	mg/l	0.2	< 0.0011	IJ	(0.0011)
Beryllium, dissolved	mg/l	0.005	<0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	IJ	(0.001)
Calcium, dissolved	mg/l	5	0.0427	UJ	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	U	(0.0043)
Cobalt, dissolved	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, dissolved	mg/i	0.025	<0.0049	U	(0.0049)
Iron, dissolved	mg/l	0.1	0.0105	UJ	(0.0068)
Lead, dissolved	mg/l	0.003	0.0027	Ų	(0.002)
Magnesium, dissolved	mg/l	5	< 0.0257	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.0017	UJ	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	0.0099	υ	(0.0099)
Potassium, dissolved	mg/l	5	0.278	U	(0.135)
Selenium, dissolved	mg/l	0.005	0.0032	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	υ	(0.0058)
Sodium, dissolved	mg/l	5	<0.07	UJ	(0.07)
Thallium, dissolved	mg/ī	0.01	<0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/l	0.05	< 0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	<0.0034	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-9

Chemical Parameter		CRDL	03	/19/	90	08	/17/	90	10	V18/	10	04	V1 6 /	91	
Aluminum, dissolved	mg/l	0.2	<0.027	u	(0.0270)		_		<0.0385	U	(0.0385)	<0.0215	U	(0.0215)	
Antimony, dissolved	mg/l	0.06	< 0.037	Ų	(0.0370)		-		0.0535	A	(0.0096)	<0.0223	U	(0.0223)	
Arsenic, dissolved	mg/l	0.01	0.0028	Α	(0.0020)	0.0046	J	(0.0020)	0.0078	A	(0.0030)	<u><0.0127</u>	A.	(0.0011)	
Barlum, dissolved	mg/l	0.2	0.0191	J	(0.0020)	0.0089	A	(0.0010)	0.0078	A	(0.0006)	<0.0078	U	(0.0011)	
Beryllium, dissolved	mg/l	0.005	< 0.001	U	(0.0010)		-		0.0004	U	(0.0003)	0.0006	Ų	(0.00019)	
Cadmium, dissolved	mg/l	0.005	< 0.005	U	(0.0050)		-		< 0.0017	UJ	(0.0017)	<0.001	U	(0.001)	
Calcium, dissolved	mg/l	5	141	J	(0.0200)		-		195.0000	A	(0.0327)	207	A	(0.0183)	
Chromium, dissolved	mg/l	0.01	< 0.003	U	(0.0030)		-		0.4550	J	(0.0017)	<0.0043	U	(0.0043)	
Cobalt, dissolved	mg/l	0.05	<0.007	U	(0.0070)		-		0.0095	u	(0.0017)	<0.0041	U	(0.0041)	
Copper, dissolved	mg/l	0.025	< 0.006	U	(0.0060)		-		0.0316	Ų	(0.0045)	0.0058	J	(0.0049)	
fron, dissolved	mg/l	0.1	0.032	J	(0.0030)		-		1.7100	Α	(0.0114)	0.0186	UJ	(0.0068)	
Lead, dissolved	mg/l	0.003	< 0.002	U	(0.0020)		_		0.0010	UJ	(0.0010)	<0.002	U	(0.002)	
Magnesium, dissolved	mg/l	5	<u>15.1</u>	j	(0.0370)		-		15.7000	Α	(0.0301)	<u>13.7</u>	Α	(0.0257)	
Manganese, dissolved	mg/l	0.015	0.115	A	(0.0010)		-		0.1670	Α	(0.0005)	0.17	J	(0.0012)	
Mercury, dissolved	mg/l	0.0002	< 0.2	Ų	(0.2000)		_		0.1000	ŲJ	(0.1000)	<0.0001	UJ	(0.0001)	
Nickel, dissolved	mg/i	0.04	< 0.012	U	(0.0120)		_		0.3470	A	(0.0107)	<0.0099	U	(0.0099)	
Potassium, dissolved	mg/l	5	2.87	Α	(0.9000)		-		1,2000	J	(0.9700)	2.79	j	(0.135)	
Selenium, dissolved	mg/l	0.005	<0.002	U	(0.0020)		_		0.0030	U	(0.0030)	0.018	UJ	(0.0032)	
Silver, dissolved	mg/l	0.01	< 0.003	U	(0.0030)		-		0.0084	U	(0.0084)	<0.0058	U	(0.0058)	
Sodium, dissolved	mg/l	5	232	J	(0.0380)		_		22.3000	Α	(0.0116)	18.8	A	(0.07)	
Thatlium, dissolved	mg/l	0.01	< 0.004	U	(0.0040)		-		0.0020	U	(0.0020)	<0.0019	Ų	(0.0019)	
Vanadium, dissolved	mg/l	0.05	< 0.006	U	(0.0060)		-		0.0029	Α	(0.0020)	<0.0047	U	(0.0047)	
Zinc, dissolved	mg/I	0.02	0.0421	R	(0.0080)	<0.006	U	(0.0060)	0.0188	IJ	(0.0019)	<0.0034	U	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-12

Chemical Parameter		CRDL	03	V15/	90	QE.	08/15/90			10/15/90				91
Aluminum, dissolved	mg/t	0.2	<0.027	υ	(0.0270)		_		<0.0385	U	(0.0385)	<0.0215	Ų	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.037	U	(0.0370)		_		0.0508	J	(0.0096)	<0.0223	Ų	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.422	Α	(0.0020)	0.0364	J	(0.002)	0.5560	A	(0.0030)	0.572	A	(0.0265)
Barium, dissolved	mg/l	0.2	0.101	j	(0.0020)	0.04	A	(0.001)	0.0944	A	(0.0006)	0.229	j	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.001	U	(0.0010)		-		<0.0003	U	(0.0003)	<0.00019	W	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.005	Ų	(0.0050)		_		0.0034	U	(0.0017)	<0.001	IJ	(0.001)
Calcium, dissolved	mg/l	5	491	J	(0.0200)		-		344.0000	A	(0.0327)	<u>42.1</u>	j	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0355	Α	(0.0030)		_		0.0498	J	(0.0017)	0.0109	A	(0.0043)
Cobalt, dissolved	mg/i	0.05	<0.007	U	(0.0070)		-		0.0041	U	(0.0017)	0.0112	A	(0.0041)
Copper, dissolved	mg/l	0.025	< 0.006	U	(0.0060)		-		0.0590	U	(0.0045)	0,0067	U	(0.0049)
fron, dissolved	mg/l	0.1	<u>5.13</u>	J	(0.0030)		-		0.1200	U	(0.0114)	47.6	J	(8800.0)
Lead, dissolved	mg/l	0.003	< 0.002	Ų	(0.0020)		-		<0.0010	IJ	(0.0010)	<0.002	U	(0.002)
Magnesium, dissolved	mg/l	5	108	J	(0.0370)		_		130.0000	A	(0.0301)	<u>31.1</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.4	Α	(0.0010)		-		0.2240	A	(0.0005)	<u>1.31</u>	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.2	U	(0.2000)	•	-		<0.1000	UJ	(0.1000)	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	< 0.012	U	(0.0120)		-		<0.0107	UJ	(0.0107)	<0.0099	Ų	(0.0099)
Potassium, dissolved	mg/l	5	9.18	Α	(0.9000)		-		10.4000	J	(0.9700)	<u>15.2</u>	A	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.002	U	(0.0020)		-		<0.0030	IJ	(0.0030)	< 0.0032	IJ	(0.0032)
Silver, dissolved	mg/l	0.01	< 0.003	U	(0.0030)		-		<0.0084	U	(0.0084)	<0.0058	Ų	(0.0058)
Sodium, dissolved	mg/l	5	<u>150</u>	J	(0.0380)		-		220,0000	A	(0.0116)	<u>31.6</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	< 0.004	U	(0.0040)		-		<0.0020	U	(0.0020)	<0.0019	IJ	(0.0019)
Vanadium, dissolved	mg/l	0.05	0.0224	Α	(0.0060)		-		0.0424	A	(0.0020)	0.0057	A	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0463	Я	(0.0080)	0.009	J	(0.006)	0.0323	Ų	(0.0019)	0.0098	υ	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-14

Chemical Parameter		CRDL	03	V15/	90	90	90	04	V12/	91	
Aluminum, dissolved	mg/l	0.2	<0.027	U	(0.0270)		-		<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.037	U	(0.0370)		-		< 0.0223	U	(0.0223)
Arsenic, dissolved	mg/I	0.01	0.0075	A	(0.0020)	0.0041	J	(0.0020)	0.0351	J	(0.0011)
Barium, dissolved	mg/l	0.2	0.0280	J	(0.0020)	0.0311	A	(0.0010)	0.0364	A	(0.0011)
Beryllium, dissolved	mg/l	0.005	<0.001	U	(0.0010)		-		0.0004	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0055	Α	(0.0050)		-		0.0033	A	(0.001)
Calcium, dissolved	mg/l	5	87.9000	j	(0.0200)		_		125	A	(0.0183)
Chromium, dissolved	mg/i	0.01	<0.003	U	(0.0030)		-		0.0044	A	(0.0043)
Cobalt, dissolved	mg/i	0.05	0.0103	Α	(0.0070)		-		0.0116	A	(0.0041)
Copper, dissolved	mg/l	0.025	0.0176	A	(0.0060)		-		0.0156	J	(0.0049)
Iron, dissolved	mg/l	0.1	0.6280	J	(0.0030)		-		3.6	J	(0.0068)
Lead, dissolved	mg/l	0.003	0.0163	Α	(0.0020)		•		0.0063	U	(0.002)
Magnesium, dissolved	mg/l	5	5.1700	J	(0.0370)		-		5.59	A	(0.0257)
Manganese, dissolved	mg/l	0.015	0.0474	Α	(0.0010)		_		0.292	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.2	U	(0.2000)		-		< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	< 0.012	U	(0.0120)		-		0.0139	A	(0.0099)
Potassium, dissolved	mg/l	5	3.1100	Α	(0.9000)		-		4.57	J	(0.135)
Selenium, dissolved	mg/l	0.005	0.0352	Α	(0.0020)		_		0.008	J	(0.0032)
Silver, dissolved	mg/l	0.01	< 0.003	U	(0.0030)		_		<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	12.7000	J	(0.0380)		-		14.4	Α	(0.07)
Thallium, dissolved	mg/l	0.01	<0.004	Ų	(0.0040)		_		0.0023	Α	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.008	U	(0.0060)		_		< 0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	2.1100	R	(0.0080)	<u>1.61</u>	J	(0.0060)	0.898	A	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-17

Chemical Parameter		CRDL	03	V15/	90	08	/14/9	0	10	V16/1	90	04	V11/	91
Aluminum, dissolved	mg/l	0.2	<0.027	U	(0.0270)		_		<0.0385	U	(0.0385)	0.121	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.037	U	(0.0370)		_		0.0305	A	(0.0096)	<0.0223	W	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.1640	Α	(0.0020)	0.083	J	0.002	0.1640	A	(0.0030)	0.0371	J	(0.0011)
Barium, dissolved	mg/l	0.2	0.0519	J	(0.0020)	0.023	Α	0.001	0.0317	A	(0.0006)	0.017	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	<0.001	U	(0.0010)		-		<0.0003	U	(0.0003)	0.0024	J	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.005	U	(0.0050)		_		0.0033	A	(0.0017)	<0.001	W	(0.001)
Calcium, dissolved	mg/l	5	236.0000	J	(0.0200)		_		108.0000	A	(0.0327)	465	A	(0.01B3)
Chromium, dissolved	mg/l	0.01	0.0265	Α	(0.0030)		-		0.0213	J	(0.0017)	0.0383	A	(0.0043)
Cobalt, dissolved	mg/l	0.05	<0.007	U	(0.0070)		-		0.0044	U	(0.0017)	<0.0041	U	(0.0041)
Copper, dissolved	mg/l	0.025	<0.006	U	(0.0060)		_		0.1880	U	(0.0045)	0.0113	U	(0.0049)
Iron, dissolved	mg/l	0.1	0.8310	J	(0.0030)		_		0.1490	U	(0.0114)	<u>81.1</u>	J	(0.0068)
Lead, dissolved	mg/l	0.003	<0.002	U	(0.0020)		-		<0.0010	IJ	(0.0010)	<0.002	UJ	(0.002)
Magnesium, dissolved	mg/l	5	70.8000	J	(0.0370)		-		68.3000	A	(0.0301)	<u>85.7</u>	A	(0.0257)
Manganese, dissolved	mg/l	0.015	0.4360	A	(0.0010)		-		0.1860	A	(0.0005)	1.82	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.2	Ų	(0.2000)		-		<0.1000	U	(0.1000)	<0.0001	ŲJ	(0.0001)
Nickel, dissolved	mg/l	0.04	< 0.012	U	(0.0120)		-		0.0173	Α	(0.0107)	0.0109	A	(0.0099)
Potassium, dissolved	mg/l	5	261.0000	Α	(0.9000)		_		11.5000	A	(0.9700)	47.1	J	(0.135)
Selenium, dissolved	mg/l	0.005	<0.002	Ų	(0.0020)		-		<0.0030	U	(0.0030)	< 0.0032	ŲJ	(0.0032)
Silver, dissolved	mg/l	0.01	< 0.003	U	(0.0030)		-		<0.0084	U	(0.0084)	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	663.0000	J	(0.0380)		_		<u>197.0000</u>	Α	(0.0116)	<u>1480</u>	A	(0.07)
Thallium, dissolved	mg/l	0.01	<0.004	U	(0.0040)		-		<0.0020	ปป	(0.0020)	<0.0019	IJ	(0.0019)
Vanadium, dissolved	mg/l	0.05	0.0134	Α	(0.0060)		-		0.1280	Α	(0.0020)	0.0187	J	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0785	R	(0.0080)	0.0632	j	0.006	0.0370	U	(0.0019)	0.0149	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-18

	Chemical Parameter		CRDL	03	/15/	90	08	/15/	90	10	V16/	20	04	V17/	91
	Aluminum, dissolved	mg/l	0.2	<0.027	υ	(0.0270)		_		<0.0385	U	(0.0385)	<0.0215	U	(0.0215)
	Antimony, dissolved	mg/l	0.06	< 0.037	U	(0.0370)		_		0.0231	A	(0.0096)	<0.0223	U	(0.0223)
-	Arsenic, dissolved	mg/l	0.01	<0.002	U	(0.0020)	0.0031	J	(0.002)	<0.003	U	(0.0030)	0.0024	U	(0.0011)
	Barium, dissolved	mg/l	0.2	0.1960	j	(0.0020)	0.0179	Α	(0.001)	0.0174	A	(0.0006)	0.0035	J	(0.0011)
	Beryllium, dissolved	mg/l	0.005	<0.001	U	(0.0010)		_		< 0.0003	U	(0.0003)	<0.00019	IJ	(0.00019)
	Cadmium, dissolved	mg/l	0.005	0.0252	Α	(0.0050)		_		0.0267	A	(0.0017)	0.026	J	(0.001)
E	Calcium, dissolved	mg/l	5	83.3000	j	(0.0200)		_		78.8000	A	(0.0327)	<u>107</u>	j	(0.0183)
•	Chromium, dissolved	mg/l	0.01	<0.003	U	(0.0030)		_		0.0201	J	(0.0017)	<0.0043	U	(0.0043)
	Cobalt, dissolved	mg/l	0.05	0.0168	Α	(0.0070)		_		0.0131	A	(0.0017)	0.0173	A	(0.0041)
	Copper, dissolved	mg/l	0.025	0.1220	Α	(0.0060)		_		0.1370	U	(0.0045)	0.178	A	(0.0049)
-	Iron, dissolved	mg/l	0.1	0.5770	J	(0.0030)		_		0.9600	Α	(0.0114)	1.59	J	(8800.0)
•	Lead, dissolved	mg/l	0.003	<0.002	U	(0.0020)		_		< 0.0010	UJ	(0.0010)	< 0.002	UJ	(0.002)
	Magnesium, dissolved	mg/l	5	8.5800	j	(0.0370)		_		7.4900	A	(0.0301)	9.97	j	(0.0257)
	Manganese, dissolved	mg/l	0.015	0.7360	Α	(0.0010)		_		0.5260	A	(0.0005)	0.892	J	(0.0012)
	Mercury, dissolved	mg/l	0.0002	<0.2	U	(0.2000)		_		<0.1000	U	(0.1000)	<0.0001	UJ	(0.0001)
	Nickel, dissolved	mg/l	0.04	0.0133	Α	(0.0120)		_		0.0166	Α	(0.0107)	0.012	A	(0.0099)
	Potassium, dissolved	mg/l	5	6.0700	Α	(0.9000)		_		3.1900	J	(0.9700)	6.28	Α	(0.135)
	Selenium, dissolved	mg/l	0.005	0.0020	Α	(0.0020)		_		<0.0030	υ	(0.0030)	< 0.0032	UJ	$\{0.0032\}$
	Silver, dissolved	mg/l	0.01	<0.003	U	(0.0030)		_		<0.0084	U	(0.0084)	<0.0058	U	(0.0058)
•	Sodium, dissolved	mg/l	5	63.1000	j	(0.0380)		_		75.5000	A	(0.0116)	<u>50.4</u>	J	(0.07)
	Thallium, dissolved	mg/l	0.01	< 0.004	U	(0.0040)		-		0.0027	J	(0.0020)	<0.0019	U	(0.0019)
	Vanadium, dissolved	mg/l	0.05	< 0.006	U	(0.0060)		_		<0.0020	U	(0.0020)	< 0.0047	U	(0.0047)
	Zinc, dissolved	mg/l	0.02	8.0000	R	(0.0080)	8.99	J	(0.006)	7.3000	A	(0.0019)	<u>9.1</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-18A

Chemical Parameter	CRDL	03/15	/90	08/14	90	10	V16/1	90	04	V17/	91
Aluminum, dissolved mg	g/I 0.2	<0.027 U	(0.0270)	_		<0.0385	U	(0.0385)	<0.0215	U	(0.0215)
Antimony, dissolved mg	0.06	<0.037 U	(0.0370)	_		0.0310	A	(0.0096)	<0.0223	U	(0.0223)
Arsenic, dissolved mg	g/I 0.01	<0.002 U	(0.0020)	<0.002 U	(0.002)	<0.0030	U	(0.0030)	0.0041	U	(0.0011)
Barium, dissolved mg	g/l 0.2	<u>0.0460</u> J	(0.0020)	0.0245 A	(0.001)	0.0246	A	(0.0006)	0.0023	J	(0.0011)
Beryllium, dissolved mg	0.005	<0.001 U	(0.0010)			< 0.0003	U	(0.0003)	<0.00019	ŲJ	(0.00019)
Cadmium, dissolved mg	0.005	0.0205 A	(0.0050)	_		0.0073	U	(0.0017)	0.0172	J	(0.001)
Calcium, dissolved mg	g/l 5	122.0000 J	(0.0200)	-		80.9000	A	(0.0327)	127	J	(0.0183)
Chromium, dissolved mg	g/I 0.01	<0.003 U	(0.0030)	-		0.0148	J	(0.0017)	<0.0043	U	(0.0043)
Cobalt, dissolved mg	g/I 0.05	0.0191 A	(0.0070)	-		0,0069	U	(0.0017)	<u> 9.0118</u>	A	(0.0041)
Copper, dissolved mg	g/I 0.025	0.0351 A	(0.0060)	-		0.0268	U	(0.0045)	0.0587	Α	(0.0049)
fron, dissolved mg	g/l 0.1	0.0427 J	(0.0030)	_		0.1850	U	(0.0114)	0.525	U	(0.0068)
Lead, dissolved mg	0.003	<0.002 U	(0.0020)	-		<0.0010	ŲJ	(0.0010)	<0.002	UJ	(0.002)
Magnesium, dissolved imp	g/t 5	9.4900 J	(0.0370)	-		4.8300	A	(0.0301)	8.32	J	(0.0257)
Manganese, dissolved imp	0.015	0.6710 A	(0.0010)	-		0.1510	Α	(0.0005)	0.458	J	(0.0012)
Mercury, dissolved mg	л 0.0002	<0.2 U	(0.2000)	_		< 0.1000	U	(0.1000)	< 0.0001	UJ	(0.0001)
Nickel, dissolved mg	j/i 0.04	0.0182 A	(0.0120)	-		0.0114	Α	(0.0107)	<0.0099	U	(0.0099)
Potassium, dissolved mg	g/l 5	5.6600 A	(0.9000)	-		2.5600	J	(0.9700)	<u>4.75</u>	A	(0.135)
Selenium, dissolved mg	0.005	0.0056 A	(0.0020)	_		0.0058	J	(0.0030)	<0.0032	UJ	(0.0032)
Silver, dissolved mg	g/l 0.01	<0.003 U	(0.0030)	_		<0.0084	U	(0.0084)	<0.0058	U	(0.0058)
Sodium, dissolved mg	g/l 5	42.2000 J	(0.0380)	-		28.3000	A	(0.0116)	21.4	J	(0.07)
Thallium, dissolved mg	g/I 0.01	<0.004 U	(0.0040)	-		<0.0020	U	(0.0020)	<0.0019	UJ	(0.0019)
Vanadium, dissolved mg	g/I 0.05	<0.006 U	(0.0060)	-		<0.0020	U	(0.0020)	<0.0047	U	(0.0047)
Zinc, dissolved mg	g/l 0.02	<u>7.2200</u> R	(0.0080)	<u>4.13</u> J	(0.006)	2.1500	A	(0.0019)	6.29	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-22

Chemical Parameter		CRDL	03	/21/	90	08	/17/	90	10	¥17 <i>K</i>	90	04/16/91			
Aluminum, dissolved	mg/l	0.2	<0.027	U	(0.0270)		_		<0.0385	U	(0.0385)	<0.0215	υ	(0.0215)	
Antimony, dissolved	mg/l	0.06	< 0.037	U	(0.0370)		-		0.0618	A	(0.0096)	<0.0223	UJ	(0.0223)	
Areenic, dissolved	mg/l	0.01	0.0044	A	(0.0020)	< 0.002	U	(0.002)	< 0.0030	U	(0.0030)	0.0018	U	(0.0011)	
Barlum, dissolved	mg/l	0.2	0.1960	j	(0.0020)	0.0722	A	(0.001)	0.0886	A	(0.0006)	0.0747	J	(0.0011)	
Beryllium, dissolved	mg/l	0.005	<0.001	U	(0.0010)		_		< 0.0003	U	(0.0003)	<0.00019	IJ	(0.00019)	
Cadmium, dissolved	mg/l	0.005	< 0.005	U	(0.0050)		_		<0.0017	υ	(0.0017)	<0.001	UJ	(0.001)	
Calcium, dissolved	mg/l	5	198.0000	J	(0.0200)		-		305.0000	A	(0.0327)	<u> 384</u>	J	(0.0183)	
Chromium, dissolved	mg/l	0.01	0.0042	Α	(0.0030)		-		0.0186	J	(0.0017)	< 0.0043	U	(0.0043)	
Cobalt, dissolved	mg/l	0.05	<0.007	U	(0.0070)	•	_		0.0190	A	(0.0017)	0.0082	A	(0.0041)	
Copper, dissolved	mg/l	0.025	<0.006	U	(0.0060)		-		0.0357	U	(0.0045)	0.0494	J	(0.0049)	
fron, dissolved	mg/l	0.1	6.3200	J	(0.0030)		-		0.3360	A	(0.0114)	0.093	U	(0.0068)	
Lead, dissolved	mg/l	0.003	<0.002	υ	(0.0020)		-		0.0020	UJ	(0.0010)	0.286	Α	(0.002)	
Magnesium, dissolved	mg/l	5	52.1000	J	(0.0370)		_		62.5000	A	(0.0301)	45.5	J	(0.0257)	
Manganese, dissolved	mg/l	0.015	3.0200	Α	(0.0010)		_		2.5400	A	(0.0005)	2.16	J	(0.0012)	
Mercury, dissolved	mg/l	0.0002	<0.2	U	(0.2000)		_		<0.1000	IJ	(0.1000)	< 0.0001	UJ	(0.0001)	
Nickel, dissolved	mg/i	0.04	<0.012	U	(0.0120)		_		0.0420	Α	(0.0107)	0.0128	A	(0.0099)	
Potassium, dissolved	mg/l	5	10.5000	Α	(0.9000)		-		15.2000	Α	(0.9700)	11.5	A	(0.135)	
Selenium, dissolved	mg/l	0.005	<0.002	U	(0.0020)		_		<0.0030	U	(0.0030)	< 0.0032	UJ	(0.0032)	
Silver, dissolved	mg/I	0.01	< 0.003	υ	(0.0030)		-		< 0.0084	Ų	(0.0084)	<0.0058	U	(0.0058)	
Sodium, dissolved	mg/l	5	26.4000	J	(0.0380)		-		22.0000	A	(0.0116)	<u>13</u>	J	(0.07)	
Thallium, dissolved	mg/l	0.01	< 0.004	U	(0.0040)		_		<0.0020	U	(0.0020)	<0.0019	U	(0.0019)	
Vanadium, dissolved	mg/l	0.05	<0.006	Ų	(0.0060)		_		<0.0020	U	(0.0020)	< 0.0047	U	(0.0047)	
	mg/l	0.02	0.0457	A	(0.0080)	0.025	J	(0.006)	0.0611	U	(0.0019)	<u>0.116</u>	J	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the instrument Detection Limits for the respective analyses

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-37

Chemical Parameter		CRDL	10)/18/	90	04	1/16/	91
Aluminum, dissolved	mg/l	0.2	<0.0385	U	(0.0385)	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	0.0187	Α	(0.0096)	< 0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.3430	Α	(0.0030)	0.172	Α	(0.0011)
Barium, dissolved	mg/l	0.2	0.0245	Α	(0.0006)	0.0278	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	<0.0003	U	(0.0003)	<0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/f	0.005	<0.0017	UJ	(0.0017)	< 0.001	UJ	(0.001)
Calcium, dissolved	mg/l	5	49.7000	A	(0.0327)	<u>52</u>	J	(0.0183)
Chromium, dissolved	mg/I	0.01	0.4490	J	(0.0017)	< 0.0043	Ų	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0091	Ü	(0.0017)	<0.0041	U	(0.0041)
Copper, dissolved	mg/i	0.025	0.0927	U	(0.0045)	0.0056	Α	(0.0049)
Iron, dissolved	mg/l	0.1	2.1000	Α	(0.0114)	1.43	J	(0.0068)
Lead, dissolved	mg/l	0.003	< 0.0010	UJ	(0.0010)	< 0.002	IJ	(0.002)
Magnesium, dissolved	mg/l	5	6.3100	Α	(0.0301)	<u>7.21</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.5380	A	(0.0005)	0.257	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.1000	IJ	(0.1000)	<0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	0.3200	A	(0.0107)	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	2.8000	j	(0.9700)	4.58	Α	(0.135)
Selenium, dissolved	mg/l	0.005	<0.0030	U	(0.0030)	<0.0032	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0084	Ų	(0.0084)	<0.0058	Ų	(0.0058)
Sodium, dissolved	mg/l	5	29.3000	Α	(0.0116)	<u>21.3</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0020	U	(0.0020)	<0.0019	U	(0.0019)
Vanadium, dissolved	mg/i	0.05	0.0030	Α	(0.0020)	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0267	U	(0.0019)	0.0074	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-38

Chemical Parameter		CRDL	10	0/17/90)/17/	90	0-	04/12/91			
						Re	plica	nie					
Aluminum, dissolved	mg/l	0.2	<0.0385	U	(0.0385)	<0.0385	U	(0.0385)	< 0.0215	U	(0.0215)		
Antimony, dissolved	mg/l	0.06	0.0459	Α	(0.0096)	0.0509	Α	(0.0096)	< 0.0223	U	(0.0223)		
Arsenic, dissolved	mg/l	0.01	0.12	Α	(0.003)	0.132	Α	(0.003)	0.022	A	(0.0011)		
Barium, dissolved	mg/l	0.2	0.0117	Α	(0.0006)	0.012	Α	(0.0006)	0.0124	U	(0.0011)		
Beryllium, dissolved	mg/l	0.005	<0.0003	U	(0.0003)	<0.0003	U	(0.0003)	0.0004	U	(0.00019)		
Cadmium, dissolved	mg/l	0.005	<0.0017	U	(0.0017)	0.0018	Α	(0.0017)	< 0.001	Ų	(0.001)		
Calcium, dissolved	mg/l	5.0	126.7	A	(0.0327)	133.0	A	(0.0327)	<u>167</u>	A	(0.0183)		
Chromium, dissolved	mg/l	0.01	0.0156	J	(0.0017)	0.042	J	(0.0017)	< 0.0043	U	(0.0043)		
Cobalt, dissolved	mg/l	0.05	0.0269	A	(0.0017)	0.0291	Α	(0.0017)	0.0522	A	(0.0041)		
Copper, dissolved	mg/l	0.025	0.0416	U	(0.0045)	0.0732	U	(0.0045)	0.0062	J	(0.0049)		
Iron, dissolved	mg/l	0.1	0.632	A	(0.0114)	0.724	Α	(0.0114)	12	J	(0.0068)		
Lead, dissolved	mg/l	0.003	< 0.001	UJ	(0.001)	< 0.001	UJ	(0.001)	< 0.002	IJ	(0.002)		
Magnesium, dissolved	mg/l	5.0	<u>5.01</u>	A	(0.0301)	<u>5.21</u>	A	(0.0301)	4.49	A	(0.0257)		
Manganese, dissolved	mg/l	0.015	0.41	A	(0.0005)	0.43	A	(0.0005)	0.361	J	(0.0012)		
Mercury, dissolved	mg/l	0.0002	<0.1	UJ	(0.1)	<0.1	UJ	(0.1)	< 0.0001	IJ	(0.0001)		
Nickel, dissolved	mg/l	0.04	0.0717	Α	(0.0107)	0.0863	Α	(0.0107)	<u>0.137</u>	A	(0.0099)		
Potassium, dissolved	mg/l	5.0	6.9	Α	(0.97)	7.67	Α	(0.97)	5.45	J	(0.135)		
Selenium, dissolved	mg/l	0.005	0.003	J	(0.003)	0.0053	J	(0.003)	< 0.0032	UJ	(0.0032)		
Silver, dissolved	mg/l	0.01	< 0.0084	U	(0.0084)	< 0.0084	υ	(0.0084)	<0.0058	U	(0.0058)		
Sodium, dissolved	mg/I	5.0	<u>28.1</u>	Α	(0.0116)	28.7	Α	(0.0116)	<u>19.1</u>	Α	(0.07)		
Thallium, dissolved	mg/l	0.01	<0.002	U	(0.002)	0.0042	Α	(0.002)	<0.0019	U	(0.0019)		
Vanadium, dissolved	mg/l	0.05	0.0098	Α	(0.002)	0.0101	A	(0.002)	<0.0047	U	(0.0047)		
Zinc, dissolved	mg/l	0.02	0.275	A	(0.0019)	0.291	A	(0.0019)	<u>0.475</u>	A	(0.0034)		

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J. Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW~40

Chemical Parameter		CRDL	10	0/15/	90	Ç.	4/12/	91
Aluminum, dissolved	mg/l	0.2	<0.0385	U	(0.0385)	0.545	A	(0.0215)
Antimony, dissolved	mg/l	0.08	0.1220	J	(0.0096)	<0.0223	IJ	(0.0223)
Arsenic, dissolved	mg/l	0.01	<0.0030	U	(0.0030)	0.0036	Α	(0.0011)
Barium, dissolved	mg/l	0.2	0.0319	Α	(0.0006)	0.0323	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.0003	U	(0.0003)	0.0008	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.0017	U	(0.0017)	0.0027	j	(0.001)
Calcium, dissolved	mg/l	5	662.00 00	Α	(0.0327)	646	Α	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0027	J	(0.0017)	0.0048	Α	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0259	Α	(0.0017)	0.0464	A	(0.0041)
Copper, dissolved	mg/l	0.025	0.1240	U	(0.0045)	0.087	J	(0.0049)
Iron, dissolved	mg/l	0.1	0.0375	U	(0.0114)	0.0564	IJ	(0.0068)
Lead, dissolved	mg/l	0.003	<0.0010	UJ	(0.0010)	<0.002	UJ	(0.002)
Magnesium, dissolved	mg/l	5	<u>7.53</u> 00	Α	(0.0301)	10.5	Α	(0.0257)
Manganese, dissolved	mg/l	0.015	0.0758	Α	(0.0005)	0.0811	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.1000	UJ	(0.1000)	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0107	UJ	(0.0107)	<0.0099	υ	(0.0099)
Potassium, dissolved	mg/l	5	3.7300	J	(0.9700)	<u>4.45</u>	J	(0.135)
Selenium, dissolved	mg/l	0.005	0.0634	A	(0.0030)	0.187	J	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0084	U	(0.0084)	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	11.8000	Α	(0.0116)	<u>5.6</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0020	UJ	(0.0020)	< 0.0019	Ų	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.0020	U	(0.0020)	<0.0047	U	(0.0047)
Zinc, dissolved	mg/i	0.02	0.1320	Α	(0.0019)	0.496	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-42

Chemical Parameter		CRDL	10	0/15/1	90	0-	L/18 /	91
Aluminum, dissolved	mg/l	0.2	<0.0385	U	(0.0385)	0.0278	A	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.0096	UJ	(0.0096)	<0.0223	UJ	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.5000	A	(0.0030)	<u>0.143</u>	A	(0.0011)
Barium, dissolved	mg/l	0.2	0.1930	A	(0.0006)	0.0396	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.0003	U	(0.0003)	0.0003	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0030	U	(0.0017)	<0.001	UJ	(0.001)
Calcium, dissolved	mg/l	5	45.4000	Α	(0.0327)	<u>534</u>	J	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0042	J	(0.0017)	0.0329	A	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0263	A	(0.0017)	< 0.0041	U	(0.0041)
Copper, dissolved	mg/l	0.025	0.0063	U	(0.0045)	0.0186	υ	(0.0049)
Iron, dissolved	mg/l	0.1	24.5000	A	(0.0114)	<u>7.94</u>	j	(0.0068)
Lead, dissolved	mg/l	0.003	< 0.0010	UJ	(0.0010)	<0.002	U	(0.002)
Magnesium, dissolved	mg/l	5	31.0000	Α	(0.0301)	95.7	IJ	(0.0257)
Manganese, dissolved	mg/l	0.015	1.7300	Α	(0.0005)	0.474	j	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.1000	IJ	(0.1000)	<0.0001	IJ	(0.0001)
Nickel, dissolved	mg/l	0.04	< 0.0107	UJ	(0.0107)	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	13.8000	J	(0.9700)	<u>8.35</u>	J	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.0030	ŲJ	(0.0030)	< 0.0032	ŲJ	(0.0032)
Silver, dissolved	mg/i	0.01	< 0.0084	U	(0.0084)	< 0.0058	υ	(0.0058)
Sodium, dissolved	mg/l	5	38.3000	A	(0.0116)	<u>119</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	< 0.0020	UJ	(0.0020)	< 0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/l	0.05	0.0045	Α	(0.0020)	0.0216	J	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0185	U	(0.0019)	0.0179	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-43

Chemical Parameter		CRDL	04	04/16/91				
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)			
Antimony, dissolved	mg/l	0.06	< 0.0223	UJ	(0.0223)			
Arsenic, dissolved	mg/l	0.01	<u>0.0601</u>	Α	(0.0011)			
Barium, dissolved	mg/l	0.2	0.0257	J	(0.0011)			
Beryllium, dissolved	mg/l	0.005	< 0.00019	UJ	(0.00019)			
Cadmium, dissolved	mg/l	0.005	<0.001	UJ	(0.001)			
Calcium, dissolved	mg/l	5	<u>365</u>	J	(0.0183)			
Chromium, dissolved	mg/I	0.01	<0.0043	υ	(0.0043)			
Cobalt, dissolved	mg/l	0.05	0.017	A	(0.0041)			
Copper, dissolved	mg/l	0.025	0.0188	Ų	(0.0049)			
Iron, dissolved	mg/l	0.1	<u>5.89</u>	J	(0.0068)			
Lead, dissolved	mg/l	0.003	< 0.002	U	(0.002)			
Magnesium, dissolved	mg/l	5	<u>27.9</u>	J	(0.0257)			
Manganese, dissolved	mg/l	0.015	<u>3.57</u>	J	(0.0012)			
Mercury, dissolved	mg/l	0.0002	< 0.0001	IJ	(0.0001)			
Nickel, dissolved	mg/l	0.04	0.0126	Α	(0.0099)			
Potassium, dissolved	mg/l	5	<u>16.1</u>	A	(0.135)			
Selenium, dissolved	mg/l	0.005	0.009	J	(0.0032)			
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)			
Sodium, dissolved	mg/l	5	<u>72.1</u>	J	(0.07)			
Thallium, dissolved	mg/l	0.01	< 0.0019	U	(0.0019)			
Vanadium, dissolved	mg/l	0.05	< 0.0047	Ú	(0.0047)			
Zinc, dissolved	mg/l	0.02	0.137	J	(0.0034)			

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-44

Chemical Parameter		CRDL	04	/17/	91
Aluminum, dissolved	mg/l	0.2	<u>5.73</u>	A	(0.0215)
Antimony, dissolved	mg/l	0.08	< 0.0223	U	(0.0223)
Areenic, dissolved	mg/l	0.01	0.0043	U	(0.0011)
Barium, dissolved	mg/l	0.2	0.0232	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	0.0006	J	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0047	J	(0.001)
Calcium, dissolved	mg/l	5	102	J	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	U	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0435	Α	(0.0041)
Copper, dissolved	mg/l	0.025	<u>3.98</u>	A	(0.0049)
Iron, dissolved	mg/l	0.1	<u>18.6</u>	J	(0.0068)
Lead, dissolved	mg/l	0.003	<u>0.0445</u>	A	(0.002)
Magnesium, dissolved	mg/l	5	<u>8.87</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	<u>2.8</u>	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	0.0527	A	(0.0099)
Potassium, dissolved	mg/l	5	8.24	Α	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.0032	IJ	(0.0032)
Silver, dissolved	mg/l	0.01	< 0.0058	Ų	(0.0058)
Sodium, dissolved	mg/l	5	<u>49.5</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	0.0028	J	(0.0019)
Vanadium, dissolved	mg/l	0.05	< 0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.67	A	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-45

Chemical Parameter		CRDL	04	V17/	9 1
Aluminum, dissolved	mg/l	0.2	<0.0215	υ	(0.0215)
Antimony, dissolved	mg/l	0.06	0.0878	Α	(0.0223)
Arsenic, dissolved	mg/l	0.01	<u>0.999</u>	A	(0.0265)
Barium, dissolved	mg/l	0.2	0.0148	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, dissolved	mg/l	. 5	102	J	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	U	(0.0043)
Cobalt, dissolved	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, dissolved	mg/l	0.025	0.0087	Α	(0.0049)
Iron, dissolved	mg/l	0.1	0.746	J	(8800.0)
Lead, dissolved	mg/l	0.003	<0.002	U	(0.002)
Magnesium, dissolved	mg/l	5	<u>37.9</u>	J	(0.0257)
Manganese, dissolved	mg/i	0.015	0.332	j	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	<u>17.1</u>	Α	(0.135)
Selenium, dissolved	mg/l	0.005	0.0098	J	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>29.2</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0119	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-48

Chemical Parameter		CRDL	0-	I/1 6 /	91
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0648	J	(0.0011)
Barium, dissolved	mg/i	0.2	0.012	Ų	(0.0011)
Beryllium, dissolved	mg/l	0.005	0.0004	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	U	(0.001)
Calcium, dissolved	mg/l	5	<u>78.4</u>	A	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0051	Α	(0.0043)
Cobalt, dissolved	mg/l	0.05	<0.0041	Ų	(0.0041)
Copper, dissolved	mg/i	0.025	<0.0049	UJ	(0.0049)
Iron, dissolved	mg/l	0.1	<u>8.58</u>	J	(0.0068)
Lead, dissolved	mg/i	0.003	<0.002	UJ	(0.002)
Magnesium, dissolved	mg/l	5	<u>7.52</u>	Α	(0.0257)
Manganese, dissolved	mg/l	0.015	0.822	J	(0.0012)
Mercury, dissolved	mg/I	0.0002	<0.0001	IJ	(0.0001)
Nickel, dissolved	mg/i	0.04	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	<u>16.6</u>	j	(0.135)
Selenium, dissolved	mg/l	0.005	<0.0032	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>98.1</u>	Α	(0.07)
Thallium, dissolved	mg/l	0.01	< 0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/t	0.05	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.0145	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-48DUP

Chemical Parameter		CRDL	04	V16/1	91
Aluminum, dissolved	mg/l	0.2	< 0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	< 0.0223	υ	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0581	J	(0.0011)
Barium, dissolved	mg/l	0.2	0.0126	U	(0.0011)
Beryllium, dissolved	mg/l	0.005	0.0002	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	U	(0.001)
Calcium, dissolved	mg/l	5	90.9	A	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	υ	(0.0043)
Cobalt, dissolved	mg/l	0.05	<0.0041	U	(0.0041)
Copper, dissolved	mg/l	0.025	< 0.0049	UJ	(0.0049)
Iron, dissolved	mg/l	0.1	<u>7.81</u>	J	(8800.0)
Lead, dissolved	mg/l	0.003	< 0.002	IJ	(0.002)
Magnesium, dissolved	mg/l	5	<u>9.18</u>	Α	(0.0257)
Manganese, dissolved	mg/l	0.015	0.91	J	(0.0012)
Mercury, dissolved	mg/i	0.0002	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	<u>18.7</u>	J	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.0032	IJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>112</u>	Α	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.015	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-47

Chemical Parameter		CRDL	04	L/16/	91
Aluminum, dissolved	mg/i	0.2	0.174	A	(0.0215)
Antimony, dissolved	mg/l	0.06	0.0236	J	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.338	A	(0.0265)
Barium, dissolved	mg/l	0.2	0.0231	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/I	0.005	<0.001	UJ	(0.001)
Calcium, dissolved	mg/l	5	608	J	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	υ	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0068	Α	(0.0041)
Copper, dissolved	mg/l	0.025	0.0158	U	(0.0049)
Iron, dissolved	mg/l	0.1	<u>14.9</u>	J	(0.0068)
Lead, dissolved	mg/l	0.003	0.0336	Α	(0.002)
Magnesium, dissolved	mg/l	5	80. 8	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.653	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.0001	ŲJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0099	υ	(0.0099)
Potassium, dissolved	mg/l	5	<u>15.6</u>	Α	(0.135)
Selenium, dissolved	mg/l	0.005	<0.0032	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>75.3</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/i	0.05	< 0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	0.512	j	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-48

Chemical Parameter		CRDL	0-	4/12/	91
Aluminum, dissolved	mg/I	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0542	J	(0.0011)
Barium, dissolved	mg/l	0.2	0.0125	U	(0.0011)
Beryllium, dissolved	mg/l	0.005	0.0004	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0049	Α	(0.001)
Calcium, dissolved	mg/l	5	123	Α	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0055	Α	(0.0043)
Cobalt, dissolved	mg/i	0.05	0.0111	A	(0.0041)
Copper, dissolved	mg/l	0.025	0.0465	J	(0.0049)
tron, dissolved	mg/i	0.1	4.83	J	(0.0068)
Lead, dissolved	mg/l	0.003	<0.002	U	(0.002)
Magnesium, dissolved	mg/l	5	7.95	Α	(0.0257)
Manganese, dissolved	mg/ī	0.015	0.548	J	(0.0012)
Mercury, dissolved	mg/I	0.0002	0.0005	U	(0.0001)
Nickel, dissolved	mg/l	0.04	0.0113	Α	(0.0099)
Potassium, dissolved	mg/l	5	<u>6</u> .19	J	(0.135)
Selenium, dissolved	mg/l	0.005	0.016	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>92.4</u>	Α	(0.07)
Thallium, dissolved	mg/l	0.01	< 0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	< 0.0047	Ų	(0.0047)
Zinc, dissolved	mg/l	0.02	<u>3.92</u>	A	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-48A

Chemical Parameter		CRDL	04	V12/	91
Aluminum, dissolved	mg/i	0.2	0.111	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.0223	IJ	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.657	Α	(0.0011)
Barium, dissolved	mg/l	0.2	<u>0.0415</u>	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	0.0009	Ų	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, dissolved	mg/I	5	<u>134</u>	Α	(0.0183)
Chromium, dissolved	mg/ī	0.01	< 0.0043	U	(0.0043)
Cobalt, dissolved	mg/f	0.05	<u>0.343</u>	A	(0.0041)
Copper, dissolved	mg/l	0.025	0.0094	U	(0.0049)
Iron, dissolved	mg/l	0.1	220	J	(0.0068)
Lead, dissolved	mg/l	0.003	0.0024	U	(0.002)
Magnesium, dissolved	mg/t	5	<u>14.5</u>	A	(0.0257)
Manganese, dissolved	mg/l	0.015	2.06	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	0.0258	Α	(0.0099)
Potassium, dissolved	mg/i	5	8.84	J	(0.135)
Selenium, dissolved	mg/i	0.005	0.0064	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>98.5</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	0.0187	J	(0.0047)
Zinc, dissolved	mg/l	0.02	9.77	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-49

Chemical Parameter		CRDL	0-	4/17/	91
Aluminum, dissolved	mg/f	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0358	Α	(0.0011)
Barium, dissolved	mg/l	0.2	0.002	J	(0.0011)
Beryllium, dissolved	mg/i	0.005	< 0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/l	0.005	< 0.001	UJ	(0.001)
Calcium, dissolved	mg/l	5	<u>51.7</u>	J	(0.0183)
Chromium, dissolved	mg/t	0.01	< 0.0043	υ	(0.0043)
Cobalt, dissolved	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, dissolved	mg/l	0.025	0.0076	Α	(0.0049)
tron, dissolved	mg/l	0.1	3.66	j	(0.0068)
Lead, dissolved	mg/l	0.003	< 0.002	U	(0.002)
Magnesium, dissolved	mg/l	5	<u>3.41</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.317	j	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	IJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0099	Ų	(0.0099)
Potassium, dissolved	.mg/l	5	<u>3.4</u>	Α	(0.135)
Selenium, dissolved	mg/l	0.005	<0.0032	UJ	(0 0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>40.2</u>	j	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	<u>0.121</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-49A

Chemical Parameter		CRDL	04/18/91			
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)	
Antimony, dissolved	mg/l	0.06	< 0.0223	U	(0.0223)	
Arsenic, dissolved	mg/l	0.01	0.0613	A	(0.0011)	
Barium, dissolved	mg/l	0.2	0.0075	J	(0.0011)	
Beryllium, dissolved	mg/l	0.005	< 0.00019	UJ	(0.00019)	
Cadmium, dissolved	mg/l	0.005	<0.001	UJ	(0.001)	
Calcium, dissolved	mg/l	5	62.3	J	(0.0183)	
Chromium, dissolved	mg/l	0.01	< 0.0043	U	(0.0043)	
Cobalt, dissolved	mg/l	0.05	0.0074	A	(0.0041)	
Copper, dissolved	mg/l	0.025	0.0081	U	(0.0049)	
fron, dissolved	mg/l	0.1	2.58	J	(0.0068)	
Lead, dissolved	mg/l	0.003	<0.002	U	(0.002)	
Magnesium, dissolved	mg/l	5	5.54	J	(0.0257)	
Manganese, dissolved	mg/l	0.015	0.531	J	(0.0012)	
Mercury, dissolved	mg/l	0.0002	<0.0001	UJ	(0.0001)	
Nickel, dissolved	mg/l	0.04	<0.0099	U	(0.0099)	
Potassium, dissolved	mg/ī	5	7.28	Α	(0.135)	
Selenium, dissolved	mg/l	0.005	<0.0032	UJ	(0.0032)	
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)	
Sodium, dissolved	mg/l	5	42.9	Ĵ	(0.07)	
Thallium, dissolved	mg/l	0.01	<0.0019	IJ	(0.0019)	
Vanadium, dissolved	-	0.05	< 0.0047	U	(0.0047)	
Zinc, dissolved	mg/l	0.02	3.4	A	(0.0034)	
	Aluminum, dissolved Antimony, dissolved Arsenic, dissolved Barium, dissolved Beryllium, dissolved Cadmium, dissolved Calcium, dissolved Chromium, dissolved Copper, dissolved fron, dissolved Lead, dissolved Magnesium, dissolved Marcury, dissolved Nickel, dissolved Potassium, dissolved Selenium, dissolved Sodium, dissolved Thallium, dissolved Vanadium, dissolved	Aluminum, dissolved mg/l Antimony, dissolved mg/l Arsenic, dissolved mg/l Barium, dissolved mg/l Beryllium, dissolved mg/l Cadmium, dissolved mg/l Calcium, dissolved mg/l Chromium, dissolved mg/l Copper, dissolved mg/l Iron, dissolved mg/l Magnesium, dissolved mg/l Manganese, dissolved mg/l Mercury, dissolved mg/l Potassium, dissolved mg/l Selenium, dissolved mg/l Sodium, dissolved mg/l Sodium, dissolved mg/l Sodium, dissolved mg/l Thallium, dissolved mg/l Vanadium, dissolved mg/l	Aluminum, dissolved mg/l 0.2 Antimony, dissolved mg/l 0.06 Arsenic, dissolved mg/l 0.01 Barium, dissolved mg/l 0.005 Cadmium, dissolved mg/l 0.005 Calcium, dissolved mg/l 0.005 Chromium, dissolved mg/l 0.01 Cobalt, dissolved mg/l 0.05 Copper, dissolved mg/l 0.05 Copper, dissolved mg/l 0.05 I Lead, dissolved mg/l 0.01 Lead, dissolved mg/l 0.003 Magnesium, dissolved mg/l 0.015 Mercury, dissolved mg/l 0.015 Mercury, dissolved mg/l 0.002 Nickel, dissolved mg/l 0.002 Nickel, dissolved mg/l 0.005 Selenium, dissolved mg/l 0.005 Silver, dissolved mg/l 0.005 Silver, dissolved mg/l 0.01 Sodium, dissolved mg/l 0.01 Sodium, dissolved mg/l 0.01 Thallium, dissolved mg/l 0.01 Vanadium, dissolved mg/l 0.01 Vanadium, dissolved mg/l 0.01	Aluminum, dissolved mg/l 0.2 <0.0215 Antimony, dissolved mg/l 0.08 <0.0223	Aluminum, dissolved mg/l 0.2 <0.0215 U Antimony, dissolved mg/l 0.06 <0.0223 U Arsenic, dissolved mg/l 0.01 0.0613 A Barium, dissolved mg/l 0.2 0.0075 J Beryllium, dissolved mg/l 0.005 <0.00019 UJ Cadmium, dissolved mg/l 0.005 <0.0011 UJ Calcium, dissolved mg/l 0.01 <0.0043 U Cobalt, dissolved mg/l 0.05 0.0074 A Copper, dissolved mg/l 0.05 0.0081 U Iron, dissolved mg/l 0.01 2.58 J Lead, dissolved mg/l 0.003 <0.002 U Magnesium, dissolved mg/l 0.015 0.531 J Mercury, dissolved mg/l 0.005 0.531 J Mercury, dissolved mg/l 0.000 <0.0001 UJ Nickel, dissolved mg/l 0.000 <0.0001 UJ Nickel, dissolved mg/l 0.000 <0.0001 UJ Silver, dissolved mg/l 0.005 <0.0032 UJ Silver, dissolved mg/l 0.005 <0.0032 UJ Sodium, dissolved mg/l 0.005 <0.0032 UJ Sodium, dissolved mg/l 0.005 <0.0032 UJ Sodium, dissolved mg/l 0.01 <0.0058 U Sodium, dissolved mg/l 0.01 <0.0058 U Thallium, dissolved mg/l 0.01 <0.0019 UJ Vanadium, dissolved mg/l 0.05 <0.0047 U	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J. Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-49DUP

Chemical Parameter		CRDL	0-	6/17/	91
Aluminum, dissolved	mg/t	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0377	Α	(0.0011)
Barium, dissolved	mg/l	0.2	<0.0011	UJ	(0.0011)
Beryllium, dissolved	mg/l	0.005	< 0.00019	IJ	(0.00019)
Cadmium, dissolved	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, dissolved	mg/l	5	<u>51.2</u>	j	(0.0183)
Chromium, dissolved	mg/l	0.01	< 0.0043	U	(0.0043)
Cobalt, dissolved	mg/l	0.05	<0.0041	U	(0.0041)
Copper, dissolved	mg/i	0.025	< 0.0049	U	(0.0049)
Iron, dissolved	mg/l	0.1	3.67	J	(8800.0)
Lead, dissolved	mg/l	0.003	0.0027	U	(0.002)
Magnesium, dissolved	mg/l	5	<u>3.43</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	0.318	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	3.25	Α	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.0032	ŲJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	` 5	<u>41.3</u>	J	(0.07)
Thallium, dissolved	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0,0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	<u>0.118</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-50

Chemical Parameter		CRDL	04	V18/	91
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	<0.0223	IJ	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.126	A	(0.0011)
Barium, dissolved	mg/l	0.2	0.0683	J	(0.0011)
Beryllium, dissolved	mg/t	0.005	0.0002	U	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0189	J	(0.001)
Calcium, dissolved	mg/l	5	249	J	(0.0183)
Chromium, dissolved	mg/l	0.01	0.0115	Α	(0.0043)
Cobalt, dissolved	mg/I	0.05	0.0233	Α	(0.0041)
Copper, dissolved	mg/l	0.025	0.0217	U	(0.0049)
fron, dissolved	mg/l	0.1	43.6	J	(0.0068)
Lead, dissolved	mg/l	0.003	0.0052	U	(0.002)
Magnesium, dissolved	mg/l	5	. <u>19.3</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	<u>1.5</u>	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	< 0.0001	ŲJ	(0.0001)
Nickel, dissolved	mg/l	0.04	0.0275	Α	(0.0099)
Potassium, dissolved	mg/l	5	<u>12.5</u>	J	(0.135)
Selenium, dissolved	mg/l	0.005	< 0.0032	UJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	<u>202</u>	J	(0.07)
Thallium, dissolved	mg/I	0.01	< 0.0019	UJ	(0.0019)
Vanadium, dissolved	mg/I	0.05	< 0.0047	Ų	(0.0047)
Zinc, dissolved	mg/l	0.02	<u>11.9</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 3

Chemical Compound Class: Dissolved Metals

Monitoring Well: OW-50A

Chemical Parameter		CADL	0-	4 /16/	91
Aluminum, dissolved	mg/l	0.2	<0.0215	U	(0.0215)
Antimony, dissolved	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, dissolved	mg/l	0.01	0.0108	A	(0.0011)
Barium, dissolved	mg/l	0.2	0.0235	J	(0.0011)
Beryllium, dissolved	mg/l	0.005	<0.00019	UJ	(0.00019)
Cadmium, dissolved	mg/l	0.005	0.0211	UJ	(0.001)
Calcium, dissolved	mg/l	5	<u>110</u>	J	(0.0183)
Chromium, dissolved	mg/l	0.01	<0.0043	U	(0.0043)
Cobalt, dissolved	mg/l	0.05	0.0095	Α	(0.0041)
Copper, dissolved	mg/I	0.025	0.118	A	(0.0049)
Iron, dissolved	mg/l	0.1	1.27	J	(0.0068)
Lead, dissolved	mg/l	0.003	0.004	U	(0.002)
Magnesium, dissolved	mg/l	5	<u>7.54</u>	J	(0.0257)
Manganese, dissolved	mg/l	0.015	<u>0.575</u>	J	(0.0012)
Mercury, dissolved	mg/l	0.0002	<0.0001	UJ	(0.0001)
Nickel, dissolved	mg/l	0.04	< 0.0099	U	(0.0099)
Potassium, dissolved	mg/l	5	4.79	Α	(0.135)
Selenium, dissolved	mg/l	0.005	<0.0032	IJ	(0.0032)
Silver, dissolved	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, dissolved	mg/l	5	40.6	j	(0.07)
Thailium, dissolved	mg/l	0.01	< 0.0019	U	(0.0019)
Vanadium, dissolved	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, dissolved	mg/l	0.02	<u>7.72</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

TABLE 4
Qualified Data for Total Metals

Table 4

Chemical Compound Class: Total Metals

QA/QC Sample: 01EQB

Chemical	Parameter		CRDL		04/11/	91
Aluminum	n, total	mg/l	0.2	0.0335	U	(0.0215)
Antimony	, total	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, t	otal	mg/l	0.01	<0.0011	Ų	(0.0011)
Barium, to	otal	mg/l	0.2	0.0024	U	(0.0011)
Beryllium	, total	mg/l	0.005	< 0.0002	U	(0.0002)
Cadmium	, total	mg/i	0.005	<0.001	U	(0.001)
Calcium,	totai	mg/l	5	0.235	U	(0.0183)
Chromiun	n, total	mg/l	0.01	0.0018	U	(0.0043)
Cobalt to	tal	mg/l	0.05	< 0.0041	UJ	(0.0041)
Copper, to	otal	mg/l	0.025	<0.0049	ŲĴ	(0.0049)
fron, total		mg/l	0.1	0.0571	Α	(0.0068)
Lead, tota	ıl	mg/l	0.005	<0.002	UJ	(0.002)
M agnesiu	m, total	mg/l	5	<0.0658	U	(0.0257)
Mangane	se, total	mgЛ	0.015	<0.0012	UJ	(0.0012)
Mercury,	total	mg/l	0.0002	< 0.0001	IJ	(0.0001)
Nickel, to	tal	mg/l	0.04	<0.0099	U	(0.0099)
Potassiun	n, total	mg/l	5	<0.135	UJ	(0.135)
Selenium	, total	mg/l	0.005	< 0.0032	UJ	(0.0032)
Silver, tota	al	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, t	otal	mg/l	5	0.659	U	(0.07)
Thallium,	total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium	n, total	mg/l	0.05	< 0.0047	Ų	(0.0047)
Zinc, total	l	mg/l	0.02	0.0067	U	(0.0034)
1						

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

QA/QC Sample: 02EQB

Chemical Parameter		CRDL	(04/18/	91
Aluminum, total	mg/l	0.2	0.0243	J	(0.0215)
Antimony, total	mg/l	0.06	< 0.0223	U	(0.0223)
Arcenic, total	mg/l	0.01	0.0024	U	(0.0011)
Barium, total	mg/l	0.2	<0.0011	UJ	(0.0011)
Beryllium, total	mg/l	0.005	<0.0002	UJ	(0.0002)
Cadmium, total	mg/l	0.005	<0.001	ŲJ	(0.001)
Calcium, total	mg/l	5	0.0739	j	(0.0183)
Chromium, total	mg/l	0.01	<0.0043	U	(0.0043)
Cobalt, total	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, total	mg/l	0.025	<0.0049	U	(0.0049)
Iron, total	mg/l	0.1	< 0.0068	IJ	(0.0068)
Lead, total	mg/l	0.005	<0.002	UJ	(0.002)
Magnesium, total	mg/i	5	< 0.0257	UJ	(0.0257)
Manganese, total	mg/l	0.015	<0.0012	UJ	(0.0012)
Mercury, total	mg/l	0.0002	<0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	< 0.135	U	(0.135)
Selenium, total	mg/l	0.005	< 0.0032	IJ	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	<0.07	UJ	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	< 0.0034	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-9

	Chemical Parameter		CRDL	(03/19/	90	(08/17/	90	1	0/18/	90	0-	V16/	91
_	Aluminum, total	mg/l	0.2	0.686	A	(0.027)		_		0.0988	J	(0.0385)	<0.0215	U	(0.0215)
_	Antimony, total	mg/l	0.06	< 0.037	U	(0.037)		-		0.05	A	(0.0096)	<0.0223	U	(0.0223)
	Areenic, total	mg/I	0.01	0.103	A	(0.002)	0.0220	A	(0.002)	0.0367	A	(0.003)	<u>0.0335</u>	A	(0.0011)
	Barium, total	mg/l	0.2	0.0132	Α	(0.002)	0.0087	A	(0.001)	0.0064	U	(0.0006)	0.0085	U	(0.0011)
-	Beryllium, total	mg/l	0.005	< 0.001	U	(0.001)		-		<0.0003	U	(0.0003)	0.0006	IJ	(0.0002)
	Cadmium, total	mg/l	0.005	<0.005	U	(0.005)		-		<0.0017	U	(0.0017)	<0.001	U	(0.001)
	Calcium, total	mg/l	5	139.0	A	(0.02)		-		<u>197.0</u>	A	(0.0327)	207.0	A	(0.0183)
	Chromium, total	mg/l	0.01	0.0034	A	(0.003)		-		0.428	J	(0.0017)	<0.0043	U	(0.0043)
	Cobalt, total	mg/l	0.05	<0.007	U	(0.007)		-		0.009	U	(0.0017)	<0.0041	U	(0.0041)
	Copper, total	mg/l	0.025	0.0153	A	(0.008)		-		0.0275	U	(0.0045)	0.0078	J	(0.0049)
	Iron, total	mg/l	0.1	86.3	A	(0.003)		-		5.97	J	(0.0114)	2.08	J	(0.0068)
	Lead, total	mg/l	0.005	0.0035	A	(0.002)		-		< 0.001	IJ	(0.001)	0.0024	J	(0.002)
=	Magnesium, total	mg/l	5	14.8	Α	(0.037)		-		16.2	Α	(0.0301)	13.5	A	(0.0257)
	Manganese, total	mg/i	0.015	0.389	A	(0.001)		-		0.222	J	(0.0005)	0.181	J	(0.0012)
	Mercury, total	mg/l	0.0002	<0.2	Ų	(0.2)		-		<0.1	IJ	(0.1)	<0.0001	UJ	(0.0001)
	Nickel, total	mg/l	0.04	<0.012	U	(0.012)		_		0.322	J	(0.0107)	<0.0099	U	(0.0099)
	Potassium, total	mg/l	5	3.33	Α	(0.9)		-		<0.97	IJ	(0.97)	2.86	J	(0.135)
	Selenium, total	mg/l	0.005	<0.002	U	(0.002)		-		0.03	J	(0.003)	< 0.0032	IJJ	(0.0032)
	Silver, total	mg/l	0.01	< 0.003	Ų	(0.003)		-		<0.0084	IJ	(0.0084)	<0.0058	U	(0.0058)
	Sodium, total	mg/l	5	<u>17.5</u>	Α	(0.038)		_		20.0	A	(0.0116)	18.2	A	(0.07)
	Thallium, total	mg/l	0.01	<0.004	Ų	(0.004)		-		<0.002	U	(0.002)	<0.0019	U	(0.0019)
	Vanadium, total	mg/l	0.05	<0.006	U	(0.006)		_		0.0043	A	(0.002)	<0.0047	U	(0.0047)
	Zinc, total	mg/l	0.02	0.0331	R	(800.0)	<u>0.0185</u>	J	(0.006)	0.0068	U	(0.0019)	0.0145	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the instrument Detection Limits for the respective analyses

Table 4
Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-12

Chemical Parameter		CRDL		03/15	/9 0		08/15	/90	1	0/15	/90	0	4/18/	91
Aluminum, total	mg/f	0.2	<0.027	U	(0.027)		_		0.0516	J	(0.0385)	1.04	J	(0.0215)
Antimony, total	mg/l	0.06	< 0.037	IJ	(0.037)		_		0.0547	j	(0.0096)	<0.0223	υ	(0.0223)
Areenic, total	mg/l	0.01	0.344	A	(0.002)	0.0605	A	(0.002)	0.507	A	(0.003)	0.622	A	(0.0265)
Barium, total	mg/l	0.2	0.0676	A	(0.002)	0.0415	A	(0.001)	0.105	A	(0.0006)	0.299	J	(0.0011)
Beryllium, total	mg/l	0.005	<0.001	U	(0.001)		-		<0.0003	U	(0.0003)	<0.0002	W	(0.0002)
Cadmium, total	mg/I	0.005	<0.005	U	(0.005)		-		0.0023	U	(0.0017)	<0.001	ŲJ	(0.001)
Calcium, total	mg/l	5	517.0	A	(0.02)		_		363.0	A	(0.0327)	<u>44.1</u>	J	(0.0183)
Chromium, total	mg/l	0.01	0.0389	A	(0.003)		_		0.0522	J	(0.0017)	0.0153	A	(0.0043)
Cobalt, total	mg/l	0.05	<0.007	U	(0.007)		-		0.0033	υ	(0.0017)	0.0136	J	(0.0041)
Copper, total	mg/l	0.025	<0.008	U	(0.006)		_		0.026	U	(0.0045)	0.0099	Ų	(0.0049)
Iron, total	mg/l	0.1	13.9	A	(0.003)		_		4.47	J	(0.0114)	52.6	J	(0.0068)
Lead, total	mg/l	0.005	<0.002	U	(0.002)		_		<0.001	IJ	(0.001)	<0.002	UJ	(0.002)
Magnesium, total	mg/l	5	107.0	Α	(0.037)		_		128.0	A	(0.0301)	33.1	J	(0.0257)
Manganese, total	mg/l	0.015	0.469	A	(0.001)		_		0.259	J	(0.0005)	1.38	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.2	U	(0.2)		-		<0.1	IJ	(0.1)	<0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	< 0.012	U	(0.012)		-		0.0182	J	(0.0107)	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	8.66	Α	(0.9)		_		10.9	J	(0.97)	15.8	A	(0.135)
Selenium, total	mg/l	0.005	<0.002	U	(0.002)		_		<0.003	UJ	(0.003)	<0.0032	ŲJ	(0.0032)
Silver, total	mg/l	0.01	<0.003	U	(0.003)		_		< 0.0084	UJ	(0.0084)	<0.0058	υ	(0.0058)
Sodium, total	mg/l	5	<u>130.0</u>	A	(0.038)		_		215.0	A	(0.0116)	<u>33.4</u>	J	(0.07)
Thallium, total	mg/l	0.01	< 0.004	U	(0.004)		-		<0.002	U	(0.002)	<0.0019	UJ	(0.0019)
Vanadium, total	mg/I	0.05	0.0168	A	(0.006)		-		0.0433	A	(0.002)	0.0082	A	(0.0047)
Zine, total	mg/l	0.02	0.0317	R	(800.0)	0.0204	A	(0.006)	<0.0199	U	(0.0019)	0.0155	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Summary of Ground-Water Quality Data, Arsenic Plt/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-14

Chemical Parameter		CRDL		03/15	/90	ı	08/16	/90	0	4/12/	91	
Aluminum, total	mg/l	0.2	0.242	A	(0.027)		-		<0.0215	U	(0.0215)	
Antimony, total	mg/l	0.06	<0.037	U	(0.037)		-		< 0.0223	U	(0.0223)	
Arsenic, total	mg/l	0.01	0.124	A	(0.002)	0.0154	A	(0.002)	0.0393	A	(0.0011)	
Barium, total	mg/l	0.2	0.0194	A	(0.002)	0.0291	A	(0.001)	0.0376	A	(0.0011)	
Beryllium, total	mg/l	0.005	<0.001	U	(0.001)		_		< 0.0002	U	(0.0002)	
Cadmium, total	mg/l	0.005	<0.005	U	(0.005)		-		0.0018	A	(0.001)	
Calcium, total	mg/l	5	81.3	A	(0.02)		_		113.0	A	(0.0183)	
Chromium, total	mg/l	0.01	0.0063	A	(0.003)		-		< 0.0043	Ų	(0.0043)	
Cobalt, total	mg/l	0.05	0.0085	Α	(0.007)		-		0.0116	J	(0.0041)	
Copper, total	mg/l	0.025	0.0807	A	(0.006)		-		0.0204	j	(0.0049)	
Iron, total	mg/I	0.1	21.6	A	(0.003)		-		4.66	j	(8800.0)	
Lead, total	mg/l	0.005	0.299	A	(0.002)		_		0.0397	J	(0.002)	
Magnesium, total	mg/l	5	4.75	Α	(0.037)		_		5.86	A	(0.0257)	
Manganese, total	mg/l	0.015	0.0437	A	(0.001)		_		0.313	J	(0.0012)	
Mercury, total	mg/l	0.0002	<0.2	υ	(0.2)		_		<0.0001	UJ	(0.0001)	
Nickel, total	mg/l	0.04	<0.012	Ų	(0.012)		_		<0.0099	U	(0.0099)	
Potassium, total	mg/i	5	3.47	Α	(0.9)		_		4.68	j	(0.135)	
Selenium, total	mg/l	0.005	0.0505	Α	(0.002)		-		0.0093	J	(0.0032)	
Silver, total	mg/l	0.01	<0.003	U	(0.003)		_		<0.0058	U	(0.0058)	
Sodium, total	mg/l	5	11.8	A	(0.038)		_		16.1	Α	(0.07)	
Thallium, total	mg/l	0.01	<0.004	U	(0.004)		_		0.002	Α	(0.0019)	
Vanadium, total	mg/l	0.05	< 0.006	Ū	(0.006)		_		<0.0047	U	(0.0047)	
Zinc, total	mg/l	0.02	1.91	J	(0.008)	1.51	A	(0.006)	0.913	A	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4 Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-17

Chemical Parameter		CRDL		03/15	/90		08/14	/90	1	0/16	90	O	4/11/	91
Aluminum, total	mg/l	0.2	0.122	A	(0.027)		-		0.284	Ų	(0.0385)	0.86	J	(0.0215)
Antimony, total	mg/l	0.08	< 0.037	υ	(0.037)		-		0.0215	A	(0.0096)	<0.0223	ŲJ	(0.0223)
Arsenic, total	mg/l	0.01	0.146	Α	(0.002)	0.184	A	(0.0020)	0.209	A	(0.003)	0.0507	J	(0.0011)
Barium, total	mg/l	0.2	0.0513	A	(0.002)	0.0505	A	(0.0010)	0.0407	A	(0.0006)	0.0245	J	(0.0011)
Beryllium, total	mg/l	0.005	<0.001	U	(0.001)		_		< 0.0003	U	(0.0003)	0.0032	J	(0.0002)
Cadmium, total	mg/I	0.005	<0.005	U	(0.005)		-		0.0047	A	(0.0017)	<0.001	UJ	(0.001)
Calcium, total	mg/l	5	<u> 251.0</u>	A	(0.02)		-		100.0	A	(0.0327)	<u>532.0</u>	A	(0.0183)
Chromium, total	mg/t	0.01	0.0381	A	(0.003)		-		0.0251	J	(0.0017)	0.0504	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0109	A	(0.007)		-		0.0265	A	(0.0017)	0.0083	J	(0.0041)
Copper, total	mg/l	0.025	0.0071	Α	(0.006)		-		0.202	U	(0.0045)	0.0183	Ų	(0.0049)
iron, total	mg/l	0.1	16.0	Α	(0.003)		-		8.58	J	(0.0114)	<u>104.0</u>	J	(8800.0)
Lead, total	mg/l	0.005	<0.002	U	(0.002)		-		0.004	u	(0.001)	0.0034	J	(0.002)
Magnesium, total	mg/l	5	<u>75.9</u>	Α	(0.037)		-		61.3	A	(0.0301)	116.0	A	(0.0257)
Manganese, total	mg/l	0.015	0.485	Α	(0.001)		-		0.214	J	(0.0005)	2.33	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.2	U	(0.2)		_		0.1	U	(0.1)	<0.0001	IJ	(0.0001)
Nickel, total	mg/l	0.04	0.0247	Α	(0.012)		-		0.0222	J	(0.0107)	0.0158	A	(0.0099)
Potassium, total	mg/l	5	31.3	A	(0.9)		-		8.4	U	(0.97)	56.8	J	(0.135)
Selenium, total	mg/l	0.005	<0.002	U	(0.002)		-		<0.003	UJ	(0.003)	<0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	<0.003	U	(0.003)		_		<0.0084	IJ	(0.0084)	<0.0058	Ü	(0.0058)
Sodium, total	mg/i	5	757.0	A	(0.038)		-		<u>153.0</u>	A	(0.0116)	<u>1770.0</u>	A	(0.07)
Thallium, total	mg/l	0.01	<0.004	U	(0.004)		-		<0.002	UJ	(0.002)	<0.0019	IJ	(0.0019)
Vanadium, total	mg/l	0.05	0.0259	A	(0.006)		-		0.0169	A	(0.002)	0.0444	J	(0.0047)
Zinc, total	mg/l	0.02	0.0545	R	(800.0)	0.221	A	(0.0060)	0.143	J	(0.0019)	0.0989	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-18

Chemical Parameter		CRDL		03/15	/90		08/15	190	1	0/16	190	0	4/17/	91
Aluminum, total	mg/l	0.2	0.092	A	(0.027)		-		0.0964	J	(0.0385)	<0.0215	IJ	(0.0215)
Antimony, total	mg/l	0.06	<0.037	U	(0.037)		-		0.0231	A	(0.0096)	<0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0033	A	(0.002)	0.0049	A	(0.0020)	< 0.003	Ų	(0.003)	0.0033	U	(0.0011)
Barium, total	mg/l	0.2	0.0189	A	(0.002)	0.0151	A	(0.0010)	0.0167	U	(0.0006)	0.0022	j	(0.0011)
Beryllium, total	mg/l	0.005	<0.001	U	(0.001)		•		< 0.0003	U	(0.0003)	<0.0002	IJ	(0.0002)
Cadmium, total	mg/l	0.005	0.0274	A	(0.005)		-		0.0265	A	(0.0017)	0.0239	J	(0.001)
Calcium, total	mg/l	5	84.3	A	(0.02)		_		80.7	A	(0.0327)	109.0	J	(0.0183)
Chromium, total	mg/l	0.01	<0.003	υ	(0.003)		-		0.0163	J	(0.0017)	< 0.0043	U	(0.0043)
Cobalt, total	mg/l	0.05	0.0183	Α	(0.007)		_		0.0141	A	(0.0017)	<u>0.0135</u>	J	(0.0041)
Copper, total	mg/l	0.025	0.158	Α	(0.006)		-		0.152	U	(0.0045)	0.174	A	(0.0049)
fron, total	mg/l	0.1	0.836	A	(0.003)		_		1.21	J	(0.0114)	1.79	A	(0.0068)
Lead, total	mg/l	0.005	0.002	A	(0.002)		-		<0.001	UJ	(0.001)	0.0022	J	(0.002)
Magnesium, total	mg/l	5	8.66	Α	(0.037)		_		<u>7.65</u>	Α	(0.0301)	9.32	J	(0.0257)
Manganese, total	mg/l	0.015	0.767	Α	(0.001)		-		0.541	J	(0.0005)	0.84	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.2	Ų	(0.2)		_		<0.1	U	(0.1)	<0.0001	IJ	(0.0001)
Nickel, total	mg/l	0.04	< 0.012	Ų	(0.012)		_		0.0146	J	(0.0107)	0.0109	A	(0.0099)
Potassium, total	mg/l	5	6.67	Α	(0.9)		_		3.13	J	(0.97)	6,13	A	(0.135)
Selenium, total	mg/l	0.005	<0.002	U	(0.002)		_		<0.003	UJ	(0.003)	<0.0032	IJ	(0.0032)
Silver, total	mg/l	0.01	< 0.003	U	(0.003)		_		<0.0084	UJ	(0.0084)	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	66.1	Α	(0.038)		-		<u>74.1</u>	A	(0.0116)	46.3	J	(0.07)
Thallium, total	mg/l	0.01	<0.004	U	(0.004)		-		0.0027	J	(0.002)	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	<0.006	U	(0.006)		_		<0.002	U	(0.002)	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	8.04	J	(800.0)	8.43	A	(0.0060)	<u>7.35</u>	J	(0.0019)	9.4	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the instrument Detection Limits for the respective analyses

Table 4
Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-18A

Chemical Parameter		CRDL		03/15	/90		08/14	/90	1	0/16	/90	Q	4/17/	91
Aluminum, total	mg/ī	0.2	0.749	A	(0.027)		-		0.2070	J	(0.0385)	0.922	j	(0.0215)
Antimony, total	mg/l	0.06	<0.037	υ	(0.037)		-		0.0274	A	(0.0096)	<0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0097	A	(0.002)	< 0.002	Ü	(0.0020)	<0.003	U	(0.003)	0.012	J	(0.0011)
Barium, total	mg/l	0.2	0.0205	A	(0.002)	0.0452	A	(0.0010)	0.0234	IJ	(0.0006)	0.0061	j	(0.0011)
Beryllium, total	mg/l	0.005	<0.001	U	(0.001)		-		<0.0003	U	(0.0003)	<0.0002	IJ	(0.0002)
Cadmium, total	mg/l	0.005	0.0203	A	(0.005)		-		0.0065	U	(0.0017)	0.0196	J	(0.001)
Calcium, total	mg/l	5	116.0	Α	(0.02)		-		72.7	A	(0.0327)	128.0	J	(0.0183)
Chromium, total	mg/l	0.01	0.0047	A	(0.003)		-		0.0026	U	(0.0017)	0.0053	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0195	A	(0.007)		-		0.0046	U	(0.0017)	0.0124	J	(0.0041)
Copper, total	mg/I	0.025	0.145	A	(0.008)		-		0.0422	U	(0.0045)	0.112	A	(0.0049)
Iron, total	mg/i	0.1	11.6	A	(0.003)		-		<u>2.99</u>	J	(0.0114)	7.42	A	(0.0068)
Lead, total	mg/l	0.005	0.0135	A	(0.002)		-		0.002	U	(0.001)	0.0227	J	(0.002)
Magnesium, total	mg/l	5	9.48	A	(0.037)		_		4.18	A	(0.0301)	8.43	j	(0.0257)
Manganese, total	mg/l	0.015	0.665	Α	(0.001)		_		0.117	J	(0.0005)	0.484	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.2	U	(0.2)		_		<0.1	U	(0.1)	<0.0001	ŲJ	(0.0001)
Nickel, total	mg/l	0.04	< 0.012	U	(0.012)		_		< 0.0107	Ų	(0.0107)	0.011	Α	(0.0099)
Potassium, total	mg/l	5	5.39	A	(0.9)		_		2.13	J	(0.97)	4.98	Α	(0.135)
Selenium, total	mg/l	0.005	0.0056	A	(0.002)		_		0.005	J	(0.003)	<0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	<0.003	IJ	(0.003)		_		<0.0084	IJ	(0.0084)	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	<u>33.3</u>	Α	(0.038)		-		19.6	Α	(0.0116)	<u>21.5</u>	J	(0.07)
Thallium, total	mg/l	0.01	<0.004	U	(0.004)		-		<0.002	U	(0.002)	<0.0019	IJ	(0.0019)
Vanadium, total	mg/l	0.05	<0.006	U	(0.006)		-		<0.002	U	(0.002)	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	7.87	j	(800.0)	0.239	A	(0.0060)	<u>1.8</u>	J	(0.0019)	<u>7.3</u>	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-22

	Chemical Parameter		CRDL		03/21/	90	ı	08/17	/90	1	0/17/	190	0	4/16/	91
_	Aluminum, total	mg/l	0.2	40.8	A	(0.027)		-		2.27	J	(0.0385)	0.515	J	(0.0215)
_	Antimony, total	mg/l	0.06	< 0.037	U	(0.037)		-		0.0517	A	(0.0096)	< 0.0223	ŲJ	(0.0223)
	Arsenic, total	mg/l	0.01	0.0227	A	(0.002)	<0.002	U	(0.002)	<0.003	U	(0.003)	<0.0018	U	(0.0011)
	Barium, total	mg/l	0.2	0.276	A	(0.002)	0.0789	A	(0.001)	0.0902	A	(8000.0)	0.0805	J	(0.0011)
44	Beryllium, total	mg/l	0.005	0.0011	Α	(0.001)	-	-		<0.0003	U	(0.0003)	<0.0002	UJ	(0.0002)
_	Cadmium, total	mg/l	0.005	<0.005	U	(0.005)		-		<0.0017	IJ	(0.0017)	<0.001	ŲJ	(0.001)
	Calcium, total	mg/l	5	197.0	Α	(0.02)		-		<u>231.0</u>	A	(0.0327)	<u>387.0</u>	J	(0.0183)
	Chromium, total	mg/l	0.01	0.153	Α	(0.003)		-		0.0134	U	(0.0017)	0.0058	A	(0.0043)
	Cobalt, total	mg/l	0.05	0.0404	Α	(0.007)		-		0.0192	A	(0.0017)	0,0085	J	(0.0041)
	Copper, total	mg/l	0.025	0.191	A	(0.006)		_		0.198	U	(0.0045)	0.0611	j	(0.0049)
	iron, total	mg/l	0.1	50.2	A	(0.003)		-		<u>14.5</u>	J	(0.0114)	4.31	A	(8900.0)
	Lead, total	mg/l	0.005	0.0445	A	(0.002)		-		0.0014	U	(0.001)	0.0046	J	(0.002)
46	Magnesium, total	mg/l	5	63.5	A	(0.037)		_		<u>44.1</u>	A	(0.0301)	45.3	J	(0.0257)
	Manganese, total	mg/l	0.015	3.48	A	(0.001)		-		1.68	J	(0.0005)	2.2	J	(0.0012)
	Mercury, total	mg/l	0.0002	<0.2	U	(0.2)		_		<0.1	UJ	(0.1)	<0.0001	UJ	(0.0001)
	Nickel, total	mg/l	0.04	0.0666	A	(0.012)		-		0.0472	J	(0.0107)	0.0118	A	(0.0099)
	Potassium, total	mg/l	5	18.3	A	(0.9)		-		12.4	A	(0.97)	11.5	A	(0.135)
	Selenium, total	mg/l	0.005	<0.002	U	(0.002)		-		<0.003	UJ	(0.003)	0.0160	IJ	(0.0032)
	Silver, total	mg/l	0.01	<0.003	U	(0.003)		-		0.0212	J	(0.0084)	<0.0058	U	(0.0058)
	Sodium, total	mg/l	5	<u>27.5</u>	Α	(0.038)		_		16.0	A	(0.0116)	12.8	J	(0.07)
	Thallium, total	mg/l	0.01	<0.004	U	(0.004)		-		< 0.002	U	(0.002)	<0.0019	U	(0.0019)
	Vanadium, total	mg/l	0.05	0.0709	A	(0.006)		_		0.0073	A	(0.002)	<0.0047	U	(0.0047)
	Zinc, total	mg/l	0.02	0.135	J	(800.0)	0.0501	J	(0.008)	0.0976	J	(0.0019)	0.117	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well; OW-37

Chemical Parameter		CRDL	,	10/18/	90	(D4/16/	91
Aluminum, total	mg/l	0.2	0.419	J	(0.0385)	29.6	J	(0.0215)
Antimony, total	mg/l	0.06	0.0202	Α	(0.0096)	< 0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.614	A	(0.003)	<u>0.551</u>	A	(0.0265)
Barium, total	mg/l	0.2	0.0326	Ų	(0.0006)	0.198	j	(0.0011)
Beryllium, total	mg/l	0.005	<0.0003	U	(0.0003)	0.0006	J	(0.0002)
Cadmium, total	mg/l	0.005	0.003	Α	(0.0017)	< 0.001	UJ	(0.001)
Calcium, total	mg/l	5	48.6	A	(0.0327)	<u>85.1</u>	J	(0.0183)
Chromium, total	mg/t	0.01	0.0048	J	(0.0017)	0.133	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0049	U	(0.0017)	0.0207	j	(0.0041)
Copper, total	mg/l	0.025	0.0942	U	(0.0045)	0.109	A	(0.0049)
Iron, total	mg/i	0.1	2.48	J	(0.0114)	43.5	Α	(0.0068)
Lead, total	mg/l	0.005	0.0043	U	(0.001)	0.027	J	(0.002)
Magnesium, total	mg/l	5	6.44	A	(0.0301)	20.0	J	(0.0257)
Manganese, total	mg/l	0.015	0.537	J	(0.0005)	0.692	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.1	UJ	(0.1)	<0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0107	U	(0.0107)	0.0603	Α	(0.0099)
Potassium, total	mg/l	5	2.54	J	(0.97)	11.9	Α	(0.135)
Selenium, total	mg/l	0.005	<0.003	UJ	(0.003)	<0.0032	IJ	(0.0032)
Silver, total	mg/l	0.01	< 0.0084	UJ	(0.0084)	< 0.0058	υ	(0.0058)
Sodium, total	mg/l	5	26.2	A	(0.0116)	21.8	J	(0.07)
Thallium, total	mg/l	0.01	<0.002	U	(0.002)	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	< 0.002	U	(0.002)	0.0799	Α	(0.0047)
Zinc, total	mg/l	0.02	0.025	U	(0.0019)	0.245	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4
Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Welt: OW-38

	Chemical Parameter CRDL		•	10/17/	90		10/17/		0	4/12/	91	
							F	te plic	a te			
ł	Aluminum, tolai	mg/l	0.2	<u>2.5</u>	J	(0.0385)	<u>1.15</u>	J	(0.0385)	<u>0.467</u>	J	(0.0215)
	Antimony, total	mg/l	0.06	0.0426	A	(0.0096)	0.0334	A	(0.0096)	<0.0223	U	(0.0223)
	Areenic, total	mg/l	0.01	0,222	A	(0.003)	0.173	A	(0.003)	0.237	J	(0.0011)
	Barium, total	mg/l	0.2	0.0528	A	(8000.0)	0.0307	U	(0.0006)	0.0293	A	(0.0011)
	Beryllium, total	mg/l	0.005	< 0.0003	U	(0.0003)	<0.0003	U	(0.0003)	0.0003	U	(0.0002)
	Cadmium, total	mg/l	0.005	0.003	A	(0.0017)	< 0.0017	U	(0.0017)	< 0.001	U	(0.001)
	Calcium, total	mg/l	5	120.0	Α	(0.0327)	122.0	A	(0.0327)	180.0	A	(0.0183)
	Chromium, total	mg/l	0.01	0.009	U	(0.0017)	0.0045	J	(0.0017)	0.0059	A	(0.0043)
l	Cobalt, total	mg/l	0.05	0.0284	A	(0.0017)	0.0329	IJ	(0.0017)	0.0576	J	(0.0041)
	Copper, total	mg/l	0.025	0.072	U	(0.0045)	0.092	U	(0.0045)	0.0127	J	(0.0049)
	Iron, total	mg/l	0.1	<u>6.81</u>	J	(0.0114)	<u>3.71</u>	ڧ	(0.0114)	<u>33.1</u>	J	(8800.0)
	Lead, total	mg/l	0.005	0.0262	J	(0.001)	0.0093	J	(0.001)	0.0126	J	(0.002)
i	Magnesium, total	mg/l	5	5.63	Α	(0.0301)	5.05	A	(0.0301)	5.08	A	(0.0257)
	Manganese, total	mg/l	0.015	0.431	J	(0.0005)	0.389	J	(0.0005)	0.389	J	(0.0012)
	Mercury, total	mg/l	0.0002	0.23	J	(0.1)	0.14	j	(0.1)	0.0003	J	(0.0001)
	Nickel, total	mg/l	0.04	0.0626	J	(0.0107)	0.0809	J	(0.0107)	0.151	A	(0.0099)
	Potassium, total	mg/l	5	6.82	Α	(0.97)	5.91	Α	(0.97)	5.78	J	(0.135)
	Selenium, total	mg/l	0.005	0.0052	J	(0.003)	0.0053	J	(0.003)	0.0056	UJ	(0.0032)
	Silver, total	mg/l	0.01	<0.0084	UJ	(0.0084)	<0.0084	UJ	(0.0084)	<0.0058	Ų	(0.0058)
	Sodium, total	mg/l	5	24.9	Α	(0.0116)	21.7	Α	(0.0116)	<u>21.1</u>	A	(0.07)
	Thallium, total	mg/l	0.01	<0.002	U	(0.002)	<0.002	U	(0.002)	<0.0019	U	(0.0019)
	Vanadium, total	mg/l	0.05	0.0253	Α	(0.002)	0.0191	A	(0.002)	0.0203	A	(0.0047)
	Zinc, total	mg/l	0.02	0.321	J	(0.0019)	0.0415	U	(0.0019)	0.588	A	(0.0034)

Explanation

- . CRDL Contract Required Detection Limit
- N/R Not Reported
- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: QW-40

Chemical Parameter		CRDL		10/15/	/90		04/12	/91
Aluminum, total	mg/l	0.2	<u>13.1</u>	J	(0.0385)	<u>37.4</u>	J	(0.0215)
Antimony, total	mg/l	0.06	0.143	J	(0.0096)	0.0265	J	(0.0223)
Arsenic, total	mg/l	0.01	90.0	Α	(0.003)	0.322	J	(0.0011)
Barium, total	mg/l	0.2	0.17	Α	(0.0006)	0.162	J	(0.0011)
Beryllium, totai	mg/l	0.005	0.0032	Α	(0.0003)	0.0022	J	(0.0002)
Cadmium, total	mg/l	0.005	0.0035	U	(0.0017)	0.0039	J	(0.001)
Calcium, total	mg/l	5	<u>491.0</u>	A	(0.0327)	647.0	A	(0.0183)
Chromium, total	mg/l	0.01	0.196	J	(0.0017)	0.573	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0517	A	(0.0017)	0.0658	J	(0.0041)
Copper, total	mg/l	0.025	0.298	U	(0.0045)	0.814	j	(0.0049)
Iron, total	mg/l	0.1	<u>15.4</u>	J	(0.0114)	39.4	A	(8800.0)
Lead, total	mg/l	0.005	0.0994	J	(0.001)	0.343	J	(0.002)
Magnesium, total	mg/l	5	10.4	A	(0.0301)	15.3	A	(0.0257)
Manganese, total	mg/t	0.015	0.243	J	(0.0005)	0.275	J	(0.0012)
Mercury, total	mg/l	0.0002	1.6	A	(0.1)	0.0019	J	(0.0001)
Nickel, total	mg/l	0.04	0.0371	J	(0.0107)	0.0379	Α	(0.0099)
Potassium, total	mg/l	5	5.9	j	(0.97)	7.87	J	(0.135)
Selenium, total	mg/l	0.005	0.078	J	(0.003)	0.182	J	(0.0032)
Silver, total	mg/f	0.01	<0.0084	IJ	(0.0084)	<0.0058	υ	(0.0058)
Sodium, total	mg/l	5	12.0	Α	(0.0116)	<u>6.41</u>	J	(0.07)
Thallium, total	mg/l	0.01	< 0.002	UJ	(0.002)	< 0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	0.0465	A	(0.002)	0.0612	J	(0.0047)
Zinc, total	mg/l	0.02	0.312	J	(0.0019)	0.884	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Monitoring Well: OW-42

Chemical Parameter		CRDL		10/15/90			04/18/91		
Aluminum, total	mg/l	0.2	<u>15.1</u>	J	(0.0385)	0.117	U	(0.0215)	
Antimony, total	mg/l	0.06	0.0127	J	(0.0096)	< 0.0223	UJ	(0.0223)	
Arsenic, total	mg/l	0.01	0.482	A	(0.003)	0.167	A	(0.0011)	
Barium, total	mg/l	0.2	0.287	A	(0.0006)	0.0444	j	(0.0011)	
Beryllium, total	mg/l	0.005	0.0007	A	(0.0003)	0.0005	υ	(0.0002)	
Cadmium, total	mg/l	0.005	0.0034	U	(0.0017)	0.001	J	(0.001)	
Calcium, total	mg/l	5	<u>47.3</u>	A	(0.0327)	526.0	J	(0.0183)	
Chromium, total	mg/l	0.01	0.0352	J	(0.0017)	0.0331	Α	(0.0043)	
Cobalt, total	mg/l	0.05	0.0373	A	(0.0017)	<0.0041	U	(0.0041)	
Copper, total	mg/l	0.025	0.0284	U	(0.0045)	0.0183	U	(0.0049)	
Iron, total	mg/l	0.1	47.3	J	(0.0114)	11.4	J	(0.0068)	
Lead, total	mg/l	0.005	0.0165	J	(0.001)	<0.002	UJ	(0.002)	
Magnesium, total	mg/l	5	34.8	A	(0.0301)	92.2	J	(0.0257)	
Manganese, total	mg/l	0.015	1.87	j	(0.0005)	0.469	J	(0.0012)	
Mercury, total	mg/l	0.0002	<0.1	IJ	(0.1)	< 0.0001	UJ	(0.0001)	
Nickel, total	mg/l	0.04	0.0332	J	(0.0107)	<0.0099	U	(0.0099)	
Potassium, total	mg/l	5	15.1	J	(0.97)	7.12	J	(0.135)	
Selenium, total	mg/l	0.005	<0.003	IJ	(0.003)	0.016	UJ	(0.0032)	
Silver, total	mg/l	0.01	<0.0084	IJ	(0.0084)	<0.0058	U	(0.0058)	
Sodium, total	mg/l	5	<u>35.4</u>	Α	(0.0116)	<u>113.0</u>	j	(0.07)	
Thalfium, total	mg/l	0.01	<0.002	IJ	(0.002)	< 0.0019	U	(0.0019)	
Vanadium, total	mg/l	0.05	0.0352	Α	(0.002)	0.0233	J	(0.0047)	
Zinc, total	mg/l	0.02	0.071	J	(0.0019)	0.0127	U	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-43

Chemical Parameter		CRDL		04/16/	91
Aluminum, total	mg/l	0.2	24.8	J	(0.0215)
Antimony, total	mg/l	0.06	<0.0223	IJ	(0.0223)
Arsenic, total	mg/l	0.01	0.685	A	(0.0265)
Barium, total	mg/l	0.2	0.187	J	(0.0011)
Beryllium, total	mg/l	0.005	0.0005	J	(0.0002)
Cadmium, total	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, total	mg/l	5	372.0	J	(0.0183)
Chromium, total	mg/l	0.01	0.051	Α	(0.0043)
Cobait, total	mg/l	0.05	0.0324	J	(0.0041)
Copper, total	mg/l	0.025	0.259	J	(0.0049)
Iron, total	mg/l	0.1	34.0	Α	(0.0068)
Lead, total	mg/l	0.005	0.626	A	(0.002)
Magnesium, total	mg/l	5	35.7	J	(0.0257)
Manganese, total	mg/l	0.015	3.92	J	(0.0012)
Mercury, total	mg/l	0.0002	0.0014	j	(0.0001)
Nickel, total	mg/l	0.04	0.0324	A	(0.0099)
Potassium, total	mg/l	5	22.3	Α	(0.135)
Selenium, total	mg/l	0.005	0.0199	J	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	62.8	J	$\{0.07\}$
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/t	0.05	0.0589	J	(0.0047)
Zinc, total	mg/l	0.02	0.156	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-44

	Chemical Parameter		CRDL		04/17/	91
	Aluminum, total	mg/ī	0.2	8.62	J	(0.0215)
	Antimony, total	mg/l	0.06	<0.0223	U	(0.0223)
	Arsenic, total	mg/l	0.01	0.0092	A	(0.0011)
	Barium, total	mg/t	0.2	0.0375	J	(0.0011)
į	Beryllium, total	mg/l	0.005	0.0007	j	(0.0002)
	Cadmium, total	mg/l	0.005	0.0043	J	(0.001)
	Calcium, total	mg/l	5	99.3	J	(0.0183)
	Chromium, total	mg/t	0.01	0.0084	Α	(0.0043)
	Cobait, total	mg/l	0.05	0.0461	J	(0.0041)
	Copper, total	mg/l	0.025	4.17	A	(0.0049)
	iron, total	mg/l	0.1	20.8	J	(0.0068)
	Lead, total	mg/l	0.005	0.103	J	(0.002)
	Magnesium, total	mg/l	5	9.65	J	(0.0257)
	Manganese, total	mg/l	0.015	2.83	j	(0.0012)
	Mercury, total	mg/l	0.0002	0.0002	J	(0.0001)
_	Nickel, total	mg/l	0.04	0.0586	A	(0.0099)
	Potassium, total	mg/l	5	8.88	Α	(0.135)
	Selenium, total	mg/i	0.005	<0.0032	UJ	(0.0032)
	Silver, total	mg/l	0.01	<0.0058	Ü	(0.0058)
_	Sodium, total	mg/l	5	50.0	J	(0.07)
	Thallium, total	mg/l	0.01	0.0047	J	(0.0019)
	Vanadium, total	mg/l	0.05	0.0058	Α	(0.0047)
	Zinc, total	mg/l	0.02	0.707	Α	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-45

Chemical Parameter		CRDL		04/17/	191
Aluminum, total	mg/l	0.2	1.61	J	(0.0215)
Antimony, total	mg/l	0.06	0.076	A	(0.0223)
Areenic, total	mg/l	0.01	1.26	Α	(0.0265)
Barium, total	mg/l	0.2	0.0243	J	(0.0011)
Beryllium, total	mg/l	0.005	<0.0002	UJ	(0.0002)
Cadmium, total	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, total	mg/l	5	97.7	J	(0.0183)
Chromium, total	mg/l	0.01	<0.0043	U	(0.0043)
Cobalt, total	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, total	mg/l	0.025	0.0174	Α	(0.0049)
Iron, total	mg/l	0.1	5.28	Α	(8800.0)
Lead, total	mg/l	0.005	0.0698	J	(0.002)
Magnesium, total	mg/l	5	35.3	J	(0.0257)
Manganese, total	mg/l	0.015	0.341	j	(0.0012)
Mercury, total	mg/i	0.0002	0.0014	J	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	<u>16.4</u>	Α	(0.135)
Selenium, total	mg/l	0.005	0.0126	J	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	<u>28.1</u>	J	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	< 0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	0.0291	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-46

Chem	nical Parameter		CRDL	I	D4/16/	91
J Alumi	num, total	mg/l	0.2	0.476	J	(0.0215)
Antim	ony, total	mg/l	0.06	< 0.0223	U	(0.0223)
Arsen	ic, total	mg/l	0.01	0.0837	J	(0.0011)
Barius	m, total	mg/I	0.2	0.0174	A	(0.0011)
Beryll	ium, total	mg/l	0.005	0.0004	U	(0.0002)
-	ium, total	mg/l	0.005	<0.001	U	(0.001)
Çalciu	ım, total	mg/l	5	79.3	A	(0.0183)
Chron	nium, total	mg/l	0.01	0.006	A	(0.0043)
Cobat	lt, total	mg/l	0.05	<0.0041	U	(0.0041)
Сорре	er, total	mg/l	0.025	<0.0049	IJ	(0.0049)
Iron, t	otal	mg/l	0.1	13.9	J	(0.0068)
Lead,	total	mg/l	0.005	<0.002	ŲJ	(0.002)
Magni	esium, total	mg/l	5	7.77	Α	(0.0257)
Manga	anese, total	mg/l	0.015	0.863	J	(0.0012)
Mercu	ıry, total	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nicke	i, totai	mg/l	0.04	<0.0099	U	(0.0099)
Potasi	sium, totał	mg/l	5	17.4	J	(0.135)
Seleni	ium, total	mg/l	0.005	< 0.0032	UJ	(0.0032)
Silver	, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodiu	m, total	mg/l	5	102.0	Α	(0.07)
Thallic	um, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanad	dium, total	mg/l	0.05	0.0049	A	(0.0047)
	tota!		0.02	0.0152	U	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-46DUP

Chemical Parameter		CRDL	04/16/91		
Aluminum, total	mg/l	0.2	1,34	j	(0.0215)
Antimony, total	mg/l	0.06	<0.0223	υ	(0.0223)
Arsenic, total	mg/l	0.01	0.0862	J	(0.0011)
Barium, total	mg/l	0.2	0.0216	Α	(0.0011)
Beryllium, total	mg/l	0.005	0.0005	U	(0.0002)
Cadmium, total	mg/l	0.005	0.0015	A	(0.001)
Calcium, total	mg/l	5	80.8	A	(0.0183)
Chromium, total	mg/i	0.01	0.0073	A	(0.0043)
Cobalt, total	mg/l	0.05	<0.0041	U	(0.0041)
Copper, total	mg/l	0.025	<u>0.008</u>	J	(0.0049)
iron, total	mg/l	0.1	12.8	J	(8800.0)
Lead, total	mg/l	0.005	0.0036	j	(0.002)
Magnesium, total	mg/l	5	<u>8.54</u>	Α	(0.0257)
Manganese, total	mg/l	0.015	0.831	j	(0.0012)
Mercury, total	mg/l	0.0002	<0.0001	ŲJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(9.0099)
Potassium, total	mg/l	5	16.8	J	(0.135)
Selenium, total	mg/l	0.005	<0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	<u>97.8</u>	Α	(0.07)
Thailium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg∕l	0.05	0.0062	Α	(0.0047)
Zinc, total	mg/l	0.02	0.0403	A	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- **U** Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-47

Chemical Parameter			04/18/91			
mg/l	0.2	1.12	J	(0.0215)		
mg/l	0.06	< 0.0223	UJ	(0.0223)		
mg/l	0.01	0.653	A	(0.0265)		
mg/l	0.2	0.0292	J	(0.0011)		
mg/l	0.005	<0.0002	UJ	(0.0002)		
mg/l	0.005	<0.001	UJ	(0.001)		
mg/l	5	609.0	J	(0.0183)		
mg/i	0.01	< 0.0043	U	(0.0043)		
mg/l	0.05	0.0044	J	(0.0041)		
mg/l	0.025	0.137	j	(0.0049)		
mg/l	0.1	20.7	A	(0.0068)		
mg/l	0.005	0.0358	ť	(0.002)		
mg/l	5	8.82	J	(0.0257)		
mg/l	0.015	0.695	J	(0.0012)		
mg/l	0.0002	0.0006	j	(0.0001)		
mg/l	0.04	<0.0099	U	(0.0099)		
mg/l	5	<u>15.5</u>	A	(0.135)		
mg/l	0.005	0.016	UJ	(0.0032)		
mg/l	0.01	<0.0058	U	(0.0058)		
mg/l	5	<u>57.8</u>	J	(0.07)		
mg/l	0.01	<0.0019	U	(0.0019)		
mg/l	0.05	<0.0047	U	(0.0047)		
mg/l	0.02	0.542	J	(0.0034)		
	mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l	mg/l 0.06 mg/l 0.01 mg/l 0.2 mg/l 0.005 mg/l 0.005 mg/l 0.005 mg/l 0.005 mg/l 0.025 mg/l 0.025 mg/l 0.005 mg/l 0.005 mg/l 0.005 mg/l 0.005 mg/l 0.0002 mg/l 0.004 mg/l 0.005 mg/l 0.001 mg/l 0.005 mg/l 0.001 mg/l 0.005 mg/l 0.001 mg/l 0.001 mg/l 0.005	mg/l 0.2 1.12 mg/l 0.06 <0.0223 mg/l 0.01 0.653 mg/l 0.2 0.0292 mg/l 0.005 <0.0002 mg/l 0.005 <0.001 mg/l 5 809.0 mg/l 0.05 0.0044 mg/l 0.05 0.044 mg/l 0.025 0.137 mg/l 0.1 20.7 mg/l 0.005 0.0358 mg/l 5 8.82 mg/l 0.015 0.695 mg/l 0.0002 0.0066 mg/l 0.004 <0.0099 mg/l 5 15.5 mg/l 0.01 <0.0058 mg/l 0.01 <0.0019 mg/l 0.05 <0.0047	mg/l 0.2 1.12 J mg/l 0.06 <0.0223 UJ mg/l 0.01 0.653 A mg/l 0.2 0.0292 J mg/l 0.005 <0.0002 UJ mg/l 0.005 <0.0001 UJ mg/l 0.01 <0.0043 U mg/l 0.05 0.0044 J mg/l 0.025 0.137 J mg/l 0.1 20.7 A mg/l 0.005 0.0358 J mg/l 0.015 0.695 J mg/l 0.000 0.006 J mg/l 0.004 <0.0099 U mg/l 5 15.5 A mg/l 0.01 <0.0058 U mg/l 0.01 <0.0058 U mg/l 0.01 <0.0058 U mg/l 0.01 <0.0019 U mg/l 0.01 <0.0019 U mg/l 0.01 <0.0019 U mg/l 0.05 <0.0047 U		

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-48

Chemical Parameter		CRDL		04/12/	191
Aluminum, total	mg/l	0.2	0.162	J	(0.0215)
Antimony, total	mg/l	0.06	<0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0863	J	(0.0011)
Barium, total	mg/l	0.2	0.0137	U	(0.0011)
Beryllium, total	mg/l	0.005	0.0005	U	(0.0002)
Cadmium, total	mg/l	0.005	0.0052	A	(0.001)
Calcium, total	mg/l	5	126.0	A	(0.0183)
Chromium, total	mg/l	0.01	0.0082	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0107	J	(0.0041)
Copper, total	mg/l	0.025	0.0584	J	(0.0049)
iron, total	mg/l	0.1	<u>7.5</u>	J	(0.0068)
Lead, total	mg/l	0.005	0.012	J	(0.002)
Magnesium, total	mg/l	5	7.77	Α	(0.0257)
Manganese, total	mg/l	0.015	0.535	J	(0.0012)
Mercury, total	mg/l	0.0002	< 0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	6.12	J	(0.135)
Selenium, total	mg/l	0.005	<0.0032	IJ	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	89.0	Α	(0.07)
Thallium, total	mg/l	0.01	< 0.0019	UJ	(0.0019)
Vanadium, total	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	3.86	Α	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-48A

Chemical Parameter	CRDL 04/ 12			/91		
Aluminum, total	mg/l	0.2	0.638	J	(0.0215)	
Antimony, total	mg/l	0.06	<0.0223	UJ	(0.0223)	
Arsenic, total	mg/l	0.01	0.812	Α	(0.0011)	
Barium, total	mg/l	0.2	0.0425	J	(0.0011)	
Beryllium, total	mg/l	0.005	0.0009	U	(0.0002)	
Cadmium, total	mg/l	0.005	<0.001	UJ	(0.001)	
Calcium, total	mg/l	5	141.0	A	(0.0183)	
Chromium, total	mg/l	0.01	0.0118	A	(0.0043)	
Cobalt, total	mg/l	0.05	0.363	J	(0.0041)	
Copper, total	mg/l	0.025	0.0142	U	(0.0049)	
Iron, total	mg/l	0.1	249.0	J	(0.0068)	
Lead, total	mg/l	0.005	0.0114	J	(0.002)	
Magnesium, total	mg/l	5	15.0	Α	(0.0257)	
Manganese, total	mg/l	0.015	2.16	J	(0.0012)	
Mercury, total	mg/l	0.0002	< 0.0001	UJ	(0.0001)	
Nickel, total	mg/l	0.04	0.0273	A	(0.0099)	
Potassium, total	mg/l	5	8.98	J	(0.135)	
Selenium, total	mg/l	0.005	0.0064	UJ	(0.0032)	
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)	
Sodium, total	mg/l	5	100.0	Α	(0.07)	
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)	
Vanadium, total	mg/l	0.05	0.0222	J	(0.0047)	
Zinc, total	mg/l	0.02	10.6	J	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-49

Chemical Parameter		CRDL		04/17/	91
Aluminum, total	mg/l	0.2	<0.0215	U	(0.0215)
Antimony, total	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0389	A	(0.0011)
Barium, total	mg/l	0.2	0.0047	j	(0.0011)
Beryllium, total	mg/l	0.005	< 0.0002	UJ	(0.0002)
Cadmium, total	mg/l	0.005	< 0.001	UJ	(0.001)
Calcium, total	mg/l	5	49.2	J	(0.0183)
Chromium, total	mg/l	0.01	0.006	A	(0.0043)
Cobalt, total	mg/l	0.05	< 0.0041	U	(0.0041)
Copper, total	mg/l	0.025	0.0089	A	(0.0049)
Iron, total	mg/l	0.1	4.26	A	(0.0068)
Lead, total	mg/l	0.005	0.0059	j	(0.002)
Magnesium, total	mg/l	5	3.26	J	(0.0257)
Manganese, total	mg/l	0.015	0.305	J	(0.0012)
Mercury, total	mgЛ	0.0002	<0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	3.16	Α	(0.135)
Selenium, total	mg/l	0.005	< 0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	< 0.0058	U	(0.0058)
Sodium, total	mg/l	5	<u>38.3</u>	J	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	0.142	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-49A

Chemical Parameter	CRDL	•	04/18/91			
Aluminum, total	mg/l	0.2	2.82	J	(0.0215)	
Antimony, total	mg/l	0.06	< 0.0223	U	(0.0223)	
Arsenic, total	mg/l	0.01	0.0909	A	(0.0011)	
Barium, total	mg/l	0.2	0.0165	J	(0.0011)	
Beryllium, total	mg/l	0.005	<0.0002	ŲJ	(0.0002)	
Cadmium, total	mg/l	0.005	0.0013	J	(0.001)	
Calcium, total	mg/l	5	55.5	J	(0.0183)	
Chromium, total	mg/l	0.01	0.0279	A	(0.0043)	
Cobalt, total	mg/l	0.05	0.0077	J	(0.0041)	
Copper, total	mg/l	0.025	0.0943	A	(0.0049)	
Iron, total	mg/l	0.1	6.0	J	(0.0068)	
Lead, total	mg/l	0.005	0.0325	J	(0.002)	
Magnesium, totai	mg/l	5	5.26	j	(0.0257)	
Manganese, total	mg/l	0.015	0.474	J	(0.0012)	
Mercury, total	mg/l	0.0002	0.0003	J	(0.0001)	
Nickel, total	mg/l	0.04	0.0105	A	(0.0099)	
Potassium, total	mg/l	5	5.71	A	(0.135)	
Selenium, total	mg/l	0.005	< 0.0032	UJ	(0.0032)	
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)	
Sodium, total	mg/f	5	40.3	J	(0.07)	
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)	
Vanadium, total	mg/l	0.05	0.007	A	(0.0047)	
Zinc, total	mg/l	0.02	2.95	A	(0.0034)	

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-49DUP

Chemical Parameter		CRDL	()4/17/	91
Aluminum, total	mg/l	0.2	0.0451	U	(0.0215)
Antimony, total	mg/l	0.06	< 0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0422	Α	(0.0011)
Barium, total	mg/l	0.2	0.0035	J	(0.0011)
Beryllium, total	mg/l	0.005	<0.0002	UJ	(0.0002)
Cadmium, total	mg/l	0.005	<0.001	UJ	(0.001)
Calcium, total	mg/l	5	<u>52.6</u>	J	(0.0183)
Chromium, total	mg/i	0.01	0.0077	Α	(0.0043)
Cobalt, total	mg/l	0.05	<0.0041	Ų	(0.0041)
Copper, total	mg/l	0.025	0.0085	Α	(0.0049)
Iron, total	mg/l	0.1	4.62	A	(0.0068)
Lead, total	mg/l	0.005	0.0066	J	(0.002)
Magnesium, total	mg/l	5	3.49	J	(0.0257)
Manganese, total	mg/i	0.015	0.323	J	(0.0012)
Mercury, total	mg/l	0.0002	<0.0001	UJ	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	U	(0.0099)
Potassium, total	mg/l	5	<u>3.34</u>	A	(0.135)
Selenium, total	mg/t	0.005	< 0.0032	UJ	(0.0032)
Silver, total	mg/I	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	40.8	J	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	0.131	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-50

Chemical Parameter		CRDL	(04/18/	91
Aluminum, total	mg/l	0.2	0.439	J	(0.0215)
Antimony, total	mg/i	0.06	< 0.0223	UJ	(0.0223)
Arsenic, total	mg/l	0.01	0.128	A	(0.0011)
Barium, total	mg/l	0.2	0.0759	J	(0.0011)
Beryllium, total	mg/l	0.005	<0.0002	U	(0.0002)
Cadmium, total	mg/i	0.005	0.0202	J	(0.001)
Calcium, total	mg/l	5	<u>250.0</u>	J	(0.0183)
Chromium, total	mg/l	0.01	0.0221	Α	(0.0043)
Cobalt, total	mg/l	0.05	0.0256	J	(0.0041)
Copper, total	mg/l	0.025	0.0285	U	(0.0049)
Iron, total	mg/l	0.1	44.4	J	(0.0068)
Lead, total	mg/l	0.005	<u>0.0152</u>	J	(0.002)
Magnesium, total	mg/l	5	20.5	J	(0.0257)
Manganese, total	mg/l	0.015	<u>1.61</u>	J	(0.0012)
Mercury, total	mg/l	0.0002	< 0.0001	IJ	(0.0001)
Nickel, total	mg/l	0.04	0.0275	Α	(0.0099)
Potassium, total	mg/l	5	11.9	J	(0.135)
Selenium, total	mg/l	0.005	<0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	<0.0058	U	(0.0058)
Sodium, total	mg/l	5	216.0	J	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	<0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	12.0	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Values in parentheses are the Instrument Detection Limits for the respective analyses

Table 4

Chemical Compound Class: Total Metals

Monitoring Well: OW-50A

Chemical Parameter		CRDL		D4/16/	91
Aluminum, total	mg/l	0.2	1.52	J	(0.0215)
Antimony, total	mg/l	0.06	<0.0223	U	(0.0223)
Arsenic, total	mg/l	0.01	0.0721	A	(0.0011)
Barium, total	mg/l	0.2	0.0464	J	(0.0011)
Beryllium, total	mg/l	0.005	< 0.0002	UJ	(0.0002)
Cadmium, total	mg/l	0.005	0.0118	J	(0.001)
Calcium, total	mg/l	5	92.9	j	(0.0183)
Chromium, total	mg/l	0.01	0.391	A	(0.0043)
Cobalt, total	mg/l	0.05	0.0066	J	(0.0041)
Copper, total	mg/l	0.025	0.104	Α	(0.0049)
iron, total	mg/l	0.1	4.63	A	(0.0068)
Lead, total	mg/l	0.005	0.286	J	(0.002)
Magnesium, total	mg/l	5	6.23	J	(0.0257)
Manganese, total	mg/l	0.015	0.434	J	(0.0012)
Mercury, total	mg/l	0.0002	0.0009	J	(0.0001)
Nickel, total	mg/l	0.04	<0.0099	Ų	(0.0099)
Potassium, total	mg/l	5	4.31	A	(0.135)
Selenium, total	mg/l	0.005	<0.0032	UJ	(0.0032)
Silver, total	mg/l	0.01	<0.0058	υ	(0.0058)
Sodium, total	mg/l	5	32.7	J	(0.07)
Thallium, total	mg/l	0.01	<0.0019	U	(0.0019)
Vanadium, total	mg/l	0.05	< 0.0047	U	(0.0047)
Zinc, total	mg/l	0.02	4.27	J	(0.0034)

Explanation

CRDL Contract Required Detection Limit

N/R Not Reported

- Not Analyzed

Validation Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Values in parentheses are the Instrument Detection Limits for the respective analyses

TABLE 5

Qualified Data for General Water Quality Parameters

Summary of Ground-Water Quality Data, Areenic PN/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

QAQC Sample: 01EQB

(Chemical Parameter		04	V11/	91
	pH (Field) Specific Conductance (Field)	etd umhos/cm	5.945 50	F F	(N/R) (N/R)
	Temperature (Field) Redox Potential (Field)	Deg. C mv	20.5 224	F	(N/R) (N/R)
	Total Organic Carbon (TOC) Chemical Oxygen Demand (COD	mg/l mg/l	<1.0 <10.0	U	(1.0) (10.0)
4	Total Dissolved Solids (TDS) Ammonia as N Nitrogen, Total Kjeldahl (TKN)	mg/l mg/l mg/l	<u>56</u> <u>3.7</u> <u>3.7</u>	J	(10) (0.2) (0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
 - UJ Chemical Parameter Not Detected, Detection Level Estimated
 - F Field Data

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

QA/QC Sample: 02EQB

04/18/91

pH (Field)	std	6.435	F	(N/R)
Specific Conductance (Field)	umhos/cm	1.6	F	(N/R)
Temperature (Field)	Deg. C	14.4	F	(N/R)
Redox Potential (Field)	mν	177	F	(N/R)
Total Organic Carbon (TOC)	mg/l	<1.0	U	(1.0)
Chemical Oxygen Demand (COD	mg/l	<10.0	U	(10.0)
Total Dissolved Solids (TDS)	mg/l	41	U	(10)
Ammonia as N	mg/l	0.9	U	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l	0.9	U	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

Chemical Parameter

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-8

4	Chemical Parameter		03/19/90			06	V17/	9 0	10	V1 2/	9 0	04	V16/	91
	pH (Field)	std	7.38	F	(0.01)		_		<u>6.13</u>	F	(N/R)	<u>7.625</u>	F	(N/R)
-	Specific Conductance (Field)	umhoe/cm	920.0	F	(N/R)	890.0	F	(N/R)	1020.0	F	(N/R)	980	F	(N/R)
_	Temperature (Field)	Deg. C	11.0	F	(0.1)	11.0	F	(0.1)	9.0	F	(N/R)	9.3	F	(N/FI)
	Redox Potential (Field)	mv	-174.5	F	(N/R)	164.8	F	(N/R)			•	157.5	F	(N/R)
	Total Organic Carbon (TOC)	mg/l	14.1	Ħ	(20.5)	29.2	A	(0.5)				38.5	J	(1.0)
بغن	Chemical Oxygen Demand (COD	mg/l	82.1	A	(20.0)		_					129.5	J	(10.0)
	Total Dissolved Solids (TDS)	mg/l		_	•		_					900	A	(10)
	Ammonia as N	mg/l		_			_					<2.0	U	(0.2)
	Nitrogen, Total Kjeldahl (TKN)	mg/l		_			_					3.5	Ų	(0.2)
		•												

Explanation

N/R Not Reported

Not Analyzed
 Validation Codes

Mindendu Codes

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5
Summary of Ground-Water Quality Data, Arsenic Ptt/Chromium Lagoon
Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-12

Chemical Parameter		03/15/90			04/25/90			08/15/90			10	/15/	90	04	/18/) 1	-
pH (Field)	etd	<u>7.15</u>	F	(0.01)	6.79	F	(0.01)		_		8.19	F	(N/R)	<u>7.155</u>	F	(N/R)	
Specific Conductance (Field)	umhos/cm	4200.0	F	(N/R)	4090.0	F	(N/R)	3610.0	F	(N/R)	5800.0	F	(N/R)	4300	F	(N/R)	-
Temperature (Field)	DegC	9.5	F	(0.1)	10.0	F	(0.1)	15.5	F	(0.1)	12.0	F	(N/R)	9.6	F	(N/R)	
Redox Potential (Field)	mv	-91.7	F	(N/R)	-54.9	F	(N/R)	<u>-58.1</u>	F	(N/R)		-		-111	F	(N/A)	
Total Organic Carbon (TOC)	mg/l	29.1	j	(20.5)		-		40.0	A	(0.5)		-		33.88	J	(1.0)	
Chemical Oxygen Demand (COD	mg/l	144.0	Α	(20.0)		_			-			-		97.3	J	(10.0)	
Total Dissolved Solids (TDS)	mg/l		-			_			-			-		420	J	(10)	
Ammonia as N	mg/l		-			_			-			_		2.7	Ų	(0.2)	
Nitrogen, Total Kjeldahl (TKN)	mg/l		_			_			_			-		3.9	IJ	(0.2)	
• • • •	-																

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Date
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- W Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-14

€,	Chemical Parameter		03	¥15A	90	œ	V1 6 /	90	04	V12/	91
	pH (Field)	std	5.87	F	(0.01)		_		8.445	F	(N/R)
-	Specific Conductance (Field)	umhos/cm	520.0	F	(N/R)	620.0	F	(N/R)	680	F	(N/R)
-	Temperature (Field)	Deg. C	8.5	F	(0.1)	15.0	F	(0.1)	11.2	F	(N/R)
	Redox Potential (Field)	mv	<u>178.4</u>	F	(N/R)	205.9	F	(N/R)	305	F	(N/R)
	Total Organic Carbon (TOC)	mg/l	<u>5.1</u>	R	(20.5)	10.0	A	(0.05)	7.65	j	(1.0)
-	Chemical Oxygen Demand (COD	mg/l	<20.0	Ų	(20.0)		_		17.0	J	(10.0)
_	Total Dissolved Solids (TDS)	mg/l		_			-		510	J	(10)
	Ammonia as N	mg/l		_			-		1.1	U	(0.2)
	Nitrogen, Total Kjeldahl (TKN)	mg/l		-			-		1.4	U	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5
Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon
Ground-Water investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-17

Chemical Parameter		03/15/90			04/25/90			06/14/90			10	V16 /	90	4	/11/0	1	***
pH (Field)	etd	7.01	F	(0.01)	<u>7.21</u>	F	(0.01)		-		6.95	F	(N/R)	6.78	F	(N/R)	
Specific Conductance (Field)	umhoe/cm	5670.0	F	(N/R)	4240.0	F	(N/R)	4840.0	F	(N/R)	470.0	F	(N/R)	7850	F	(N/R)	
Temperature (Field)	Deg. C	9.5	F	(0.1)	9.5	F	(0.1)	16.0	F	(0.1)	11.0	F	(N/R)	15.4	F	(N/R)	-
Redox Potential (Field)	mv	-85.0	F	(N/R)	-25.3	F	(N/R)	-89.6	F	(N/R)		_		<u>-31.85</u>	F	(N/R)	
Total Organic Carbon (TOC)	mg/l	160.0	J	(20.5)		_	, ,	120.0	A	(0.5)		_		313,15	j	(1.0)	
Chemical Oxygen Demand (COI	D mg/l	454.0	A	(20.0)		_			-			-		1030	J	(10.0)	
Total Dissolved Solids (TDS)	mg/l		_			-			_			_		76 00	A	(10)	
Ammonia as N	mg/l		_			_			-			_		280	J	(0.2)	
Nitrogen, Total Kjeldahl (TKN)	mg/l		-			-			-			-		280	J	(0.2)	

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-18

	Chemical Parameter		03/15/90			04/25/90			08/15/90			10	V16/	90	0-	4/17/	9 1	
	pH (Field)	atd	5.65	F	(0.01)	5.74	F	(0.01)		_		5.48	F	(N/R)	6.015	F	(N/R)	
1	Specific Conductance (Field)	umhos/cm	1020.0	F	(N/R)	1050.0	F	(N/R)	940.0	F	(N/R)	966.0	F	(N/R)	1500	F	(N/R)	
	Temperature (Field)	Deg. C	10.5	F	(0.1)	9.0	F	(0.1)	14.0	F	(0.1)	11.0	F	(N/R)	10.1	F	(N/R)	
	Redox Potential (Field)	mv	191.7	F	(N/R)	207.0	F	(N/R)	217.0	F	(N/R)		_		227	F	(N/R)	
	Total Organic Carbon (TOC)	mg/l	<u>5.1</u>	A	(20.5)		_		14.6	A	(0.5)		_		6.126	J	(1.0)	
-	Chemical Oxygen Demand (COD	mg/i	<20.0	U	(20.0)		_			-			_		11.8	J	(10.0)	
	Total Dissolved Solids (TDS)	mg/l		_			_			_			_		670	A	(10)	
	Ammonia as N	mg/l		_			_			-			_		22	j	(0.2)	
	Nitrogen, Total Kjeldahl (TKN)	mg/l		-			_			-			-		<u>23</u>	J	(0.2)	
-		-																

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-18A

Chemical Parameter		0	3/15/	9 0	O	V14/	90	10	V16/	90	٥	4/17/	91
pH (Field)	std	6.27	F	(0.01)		_		<u> 6.83</u>	F	(N/R)	6.08	F	(N/R)
Specific Conductance (Field)	umhos/cm	860.0	F	(N/R)	B10.0	F	(N/R)	590.0	F	(N/R)	800	F	(N/R)
Temperature (Field)	Deg. Ç	10.0	F	(0.1)	16.0	F	(0.1)	13.0	F	(N/R)	9.0	F	(N/R)
Redox Potential (Field)	mv	207.0	F	(N/R)	215.3	F	(N/R)		_		203	F	(N/R)
Total Organic Carbon (TOC)	mg/l	5.5	Α	(20.5)	13.4	A	(0.05)		_		7.25	J	(1.0)
Chemical Oxygen Demand (CO	D mg/l	52.3	A	(20.0)		_			_		16.5	J	(10.0)
Total Dissolved Solids (TDS)	mg/l		_			-			_		620	A	(10)
Ammonia as N	mg/l		_			_			_		8.4	U	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l		_			_			_		8.9	Ų	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- **W Chemical Parameter Not Detected, Detection Level Estimated**
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-22

-	Chemical Parameter		03	V21/	90	06	/17/	90	10	V17/	90	0-	V 16/	91	4	/18/9)1
	pH (Field)	std	6.34	F	(0.01)		_		<u> 6.15</u>	F	(N/R)	<u>6.545</u>	F	(N/FI)	6.81	F	(N/R)
	Specific Conductance (Field)	umhos/cm	1900.0	F	(N/R)	1890.0	F	(N/R)	2100.0	F	(N/R)	2100	F	(N/R)	<u>2100</u>	F	(N/R)
_	Temperature (Field)	Deg. C	6.5	F	(0.1)	15.0	F	(0.1)	14.0	F	(N/R)	12.4	F	(N/A)	8.3	F	(N/R)
	Redox Potential (Field)	mv	-25.6	F	(N/R)		-			_		217	F	(N/A)	<u>186</u>	F	(N/R)
	Total Organic Carbon (TOC)	mg/l	11.5	R	(20.5)	<u>15.3</u>	A	(0.05)		-			-		<u>11.54</u>	J	(1.0)
-	Chemical Oxygen Demand (COI) mg/l	24.4	A	(20.0)		-			-			-		<u>35.8</u>	J	(10.0)
	Total Dissolved Solids (TDS)	mg/l		-			-			-			-		1690	A	(10)
	Ammonia as N	mg/l		_			-			-			-		<u>23</u>	J	(0.2)
	Nitrogen, Total Kjeldahl (TKN)	mg/l		-			-			_			-		<u>23</u>	j	(0.2)
فسدد																	

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-37

Chemical Parameter		10/18/90			04/16/91		
pH (Field)	etd	6.09	F	(N/R)	6.88	F	(N/R)
Specific Conductance (Field)	umhos/cm	600.0	F	(N/R)	540	F	(N/R)
Temperature (Field)	Deg. C	13.0	F	(N/R)	14.3	F	(N/R)
Redox Potential (Field)	mγ		-		212	F	(N/R)
Total Organic Carbon (TOC)	mg/l		_		<u>7.37</u>	J	(1.0)
Chemical Oxygen Demand (COI) mg/l		-		24.4	J	(10.0)
Intal Dissolved Solids (TDS)	mg/l		-		320	A	(10)
∿≂monia as N	mg/l		-		5.4	Ų	(0.2)
∞ogen, Total Kjeldahl (TKN)	mg/l		-		6.6	U	(0.2)

- **⊷ation**
- Not Analyzed
- -station Codes
- ' Quantitative Data
- Qualitative Data
- Unusable Data
- **Chemical Parameter Not Detected**
- 33 Chemical Parameter Not Detected, Detection Level Estimated
- Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-38

***	Chemical Parameter		10/17/90			04/12/91		
	pH (Field)	std	<u>5.78</u>	F	(N/R)	6.495	F	(N/R)
	Specific Conductance (Field)	umhos/cm	780.0	F	(N/R)	815	F	(N/R)
_	Temperature (Field)	Deg. C	15.0	F	(N/R)	8.3	F	(N/R)
	Redox Potential (Field)	mv		_		142.5	F	(N/R)
	Total Organic Carbon (TOC)	mg/l		_		9.6	J	(1.0)
	Chemical Oxygen Demand (COD	mg/l		-		<10.0	U	(10.0)
	Total Dissolved Solids (TDS)	mg/l		_		1950	J	(10)
	Ammonia as N	mg/l		-		0.4	U	(0.2)
	Nitrogen, Total Kjeldahl (TKN)	mg/l		_		0.4	Ų	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-40

Chemical Parameter		10/15/90			04/12/91		
pH (Field)	s td	6.8	F	(N/R)	6.825	F	(N/R)
Specific Conductance (Field)	umhoe/cm	1980.0	F	(N/R)	2400	F	(N/R)
Temperature (Field)	Deg. C	12.0	F	(N/R)	7.6	F	(N/R)
Redox Potential (Field)	mv		-		266	F	(N/R)
Total Organic Carbon (TOC)	mg/l		-		8.5	J	(1.0)
Chemical Oxygen Demand (COD	mg/l		-		16.4	J	(10.0)
Total Dissolved Solids (TDS)	mg/l		-		2260	J	(10)
Ammonia as N	mg/l		-		1.7	U	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l		-		1.7	U	(0.2)

Explanation

N/R Not Reported

Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Areenic Pit/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-42

Chemical Parameter		emical Parameter			10/15/90			04/18/91		
	pH (Field)	etd	<u>8.21</u>	F	(N/R)	<u>7.145</u>	F	(N/R)		
-	Specific Conductance (Field)	umhos/cm	<u>3360.0</u>	F	(N/R)	<u>3600</u>	F	(N/R)		
_	Temperature (Field)	Deg. C	<u>9.0</u>	F	(N/R)	10.2	F	(N/R)		
	Redox Potential (Field)	m∨		-		-124.5	F	(N/R)		
	Total Organic Carbon (TOC)	mg/l		-		35.55	J	(1.0)		
-	Chemical Oxygen Demand (COD	mg/l		-		102.0	J	(10.0)		
_	Total Dissolved Solids (TDS)	mg/l		_		2820	j	(10)		
	Ammonia as N	mg/l		_		300	J	(0.2)		
	Nitrogen, Total Kjeldahl (TKN)	mg/l		-		300	J	(0.2)		

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-43

Chemical Parameter	04/16/91				
pH (Field)	std	6.465	F	(N/R)	
Specific Conductance (Field)	umhos/cm	2000	F	(N/R)	
Temperature (Field)	Deg. C	12.5	F	(N/R)	
Redox Potential (Field)	mv	134	F	(N/R)	
Total Organic Carbon (TOC)	mg/l	16.64	J	(1.0)	
Chemical Oxygen Demand (COD	mg/l	51.7	J	(10.0)	
Total Dissolved Solids (TDS)	mg/l	<u>1730</u>	A	(10)	
Ammonia as N	mg/l	1.2	IJ	(0.2)	
Nitrogen, Total Kjeldahl (TKN)	mg/l	5.4	U	(0.2)	

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground--Water Quality Data, Arsenic Pit/Chromium Lagoon Ground--Water Investigation, Industri-Plax Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-44

 Chemical Parameter		04/17/91				
pH (Field)	etd	<u>5.31</u>	F	(N/R)		
Specific Conductance (Field)	umhos/cm	1400	F	(N/R)		
Temperature (Field)	Deg. C	8.3	F	(N/R)		
Redox Potential (Field)	mv	240	F	(N/R)		
Total Organic Carbon (TOC)	mg/l	4.926	J	(1.0)		
Chemical Oxygen Demand (COI) mg/1	11.1	J	(10.0)		
Total Dissolved Solids (TDS)	mg/l	810	A	(10)		
Ammonia as N	mg/l	2.0	U	(0.2)		
Nitrogen, Total Kjeldahl (TKN)	mg/l	2.0	υ	(0.2)		

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-45

04/17/91

pH (Field)	std	<u>7.735</u>	F	(N/R)
Specific Conductance (Field)	umhos/cm	1400	F	(N/R)
Temperature (Field)	Deg. C	8.4	F	(N/A)
Redox Potential (Field)	mv	111	F	(N/A)
Total Organic Carbon (TOC)	mg/l	32.14	J	(1.0)
Chemical Oxygen Demand (COD	mg/l	91.8	J.	(10.0)
Total Dissolved Solids (TDS)	mg/l	860	A	(10)
Ammonia as N	mg/l	<u>37</u>	J	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l	<u>38</u>	J	(0.2)

Explanation

N/R Not Reported

Chemical Parameter

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic PWChromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-46

Chemical Parameter 04/16/91 pH (Field) atd F (N/R) 6.85 Specific Conductance (Field) umhos/cm 1000 F (N/R) Temperature (Field) Deg. C <u>5.4</u> (N/R) 85.5 Redox Potential (Field) mγ (N/R) Total Organic Carbon (TOC) mg/l 9.65 (1.0)Chemical Oxygen Demand (COD mg/l 31.6 J (10.0)Total Dissolved Solids (TDS) (10) mg/l 620 U 5.6 Ammonia as N mg/l (0.2)Nitrogen, Total Kjeldahl (TKN) 6.2 U (0.2)

mg/l

Explanation

N/R Not Reported

Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-46DUP

Chemical Parameter		04/16/91			04/12/91		
pH (Field)	etd	6.92	F	(N/R)	6.90	F	(N/R)
Specific Conductance (Field)	umhos/cm	800	F	(N/A)	<u>110</u>	F	(N/R)
Temperature (Field)	Deg. C	<u>8.4</u>	F	(N/P)	8.7	F	(N/R)
Redox Potential (Field)	mv	129.5	F	(N/R)	<u>-47</u>	F	(N/R)
Total Organic Carbon (TOC)	mg/l		-		32.2	J	(1.0)
Chemical Oxygen Demand (COD	mg/l		_		22.4	J	(10.0)
Total Dissolved Solids (TDS)	mg/i		-		600	J	(10)
Ammonia as N	mg/l		_		6.2	U	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l		-		7.2	U	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic PMChromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-47

	Chemical Parameter		0-	04/16/91			
	pH (Field)	std	6.465	F	(N/R)		
	Specific Conductance (Field)	umhos/cm	2500	F	(N/R)		
	Temperature (Field)	Deg. C	14.3	F	(N/R)		
	Redox Potential (Field)	mv	144	F	(N/R)		
	Total Organic Carbon (TOC)	mg/l	17.47	J	(1.0)		
_	Chemical Oxygen Demand (COI	mg/l	50.3	J	(10.0)		
	Total Dissolved Solids (TDS)	mg/l	2260	A	(10)		
	Ammonia as N	mg/l	10	U·	(0.2)		
	Nitrogen, Total Kjeldahi (TKN)	mg/l	11	U	(0.2)		

Explanation

N/R Not Reported

- Not Analyzed

- **A Quantitative Data**
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic Plt/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-48

Chemical Parameter

04/12/91

pH (Field)	std	5.845	F	(N/R)
Specific Conductance (Field)	umhos/cm	1200	F	(N/R)
Temperature (Field)	Deg. C	7.6	F	(N/R)
Redox Potential (Field)	mv	<u> 175.5</u>	F	(N/A)
Total Organic Carbon (TOC)	mg/l	9.0	J	(1.0)
Chemical Oxygen Demand (COD	mg/l	<10.0	U	(10.0)
Total Dissolved Solids (TDS)	mg/l	830	J	(10)
Ammonia as N	mg/l	2.4	IJ	$\{0.2\}$
Nitrogen, Total Kjeldahl (TKN)	mg/l	2.8	U	(0.2)

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic PMChromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-48A

Chemical Parameter

04/12/91

_	
F	(N/R)
F	(N/R)
F	(N/R)
J	(1.0)
J	(10.0)
J	(10)
J	(0.2)
J	(0.2)
	FJJJJ

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-49

04/17/91

pH (Field)		etd	6.645	F	(N/R)	
Specific Co	nductance (Field)	umhos/cm	<u>545</u>	F	(N/R)	
Temperatu	re (Field)	Deg. C	9.9	F	(N/R)	
Redox Pote	ential (Field)	mv	141	F	(N/R)	
Total Organ	nic Carbon (TOC)	mg/t	3.896	J	(1.0)	
Chemical C	Oxygen Demand (COD	mg/l	10.4	J	(10.0)	
Total Disso	lved Solids (TDS)	mg/l	380	A	(10)	
Ammonia s	is N	mg/l	1.9	U	(0.2)	
Nitrogen, T	otal Kjeldahl (TKN)	mg/î	2.2	U	(0.2)	

Explanation

N/R Not Reported

Chemical Parameter

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- W Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Areenic PMChromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusette.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-49A

(Chemical Parameter	04/18/91				
	pH (Field)	øtd	<u>8.455</u>	F	(N/R)	
Ĺ	Specific Conductance (Field)	umhos/cm	830	F	(N/R)	
	Temperature (Field)	Deg. C	10.3	F	(N/R)	
	Redox Potential (Field)	my	57	F	(N/P)	
	Total Organic Carbon (TOC)	mg/l	10.165	J	(1.0)	
	Chemical Oxygen Demand (COI) mg/l	22.9	J	(10.0)	
	Total Dissolved Solids (TDS)	mg/l	330	J	(10)	
	Ammonia as N	mg/l	25	J	(0.2)	
	Nitrogen, Total Kjeldahl (TKN)	mg/l	30	J	(0.2)	

Explanation

N/R Not Reported

- Not Analyzed

- **A Quantitative Data**
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon Ground-Water Investigation, Industri-Piex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well; OW-49DUP

Chemical Parameter	04/17/91				
pH (Field)	etd	6.725	F	(N/R)	
Specific Conductance (Field)	umhos/cm	550	F	(N/R)	
Temperature (Field)	Deg. C	9.8	F	(N/R)	
Redox Potential (Field)	mν	133	F	(N/R)	
Total Organic Carbon (TOC)	mg/i	4.062	J	(1.0)	
Chemical Oxygen Demand (COD	mg/l	14.0	J	(10.0)	
Total Dissolved Solids (TDS)	mg/l	360	A	(10)	
Ammonia as N	mg/l	3.6	U	(0.2)	
Nitrogen, Total Kjeldahl (TKN)	mg/l	6.7	U	(0.2)	

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Summary of Ground-Water Quality Data, Arsenic Pit/Chromium Lagoon Ground-Water Investigation, Industri-Plex Site, Woburn, Massachusetts.

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-60

pH (Field) Specific Conductance (Field) Temperature (Field)			04/18/91				
_	pH (Field)	etd	<u>5.72</u>	F	(N/R)		
	Specific Conductance (Field)	umhos/cm	<u>2700</u>	F	(N/R)		
	Temperature (Field)	Deg. C	9.6	F	(N/R)		
	Redox Potential (Field)	mv	75	F	(N/R)		
	Total Organic Carbon (TOC)	mg/l	21.385	j	(1.0)		
	Chemical Oxygen Demand (COI	D mg/I	86.3	J	(10.0)		
	Total Dissolved Solids (TDS)	mg/l	1800	J	(10)		
	Ammonia as N	mg/l	33	j	(0.2)		
	Nitrogen, Total Kjeldahl (TKN)	mg/l	<u>34</u>	j	(0.2)		

Explanation

N/R Not Reported

- Not Analyzed

- A Quantitative Data
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data

Table 5

Chemical Compound Class: General Water Quality Parameters

Monitoring Well: OW-50A

Chemical Parameter		04/16/91		01	04/18/91		
pH (Field)	etd	<u>6.12</u>	F	(N/R)	5.85	F	(N/A)
Specific Conductance (Field)	umhos/cm	755	F	(N/R)	1200	F	(N/R)
Temperature (Field)	Deg. C	13.7	F	(N/R)	9.5	F	(N/R)
Redox Potential (Field)	mv	243	F	(N/R)	151	F	(N/R)
Total Organic Carbon (TOC)	mg/l		-		8.962	J	(1.0)
Chemical Oxygen Demand (CO	D mg/l		-		24.7	J	(10.0)
Total Dissolved Solids (TDS)	mg/l		_		490	A	(10)
Ammonia as N	mg/l		_		17	IJ	(0.2)
Nitrogen, Total Kjeldahl (TKN)	mg/l		_		18	U	(0.2)

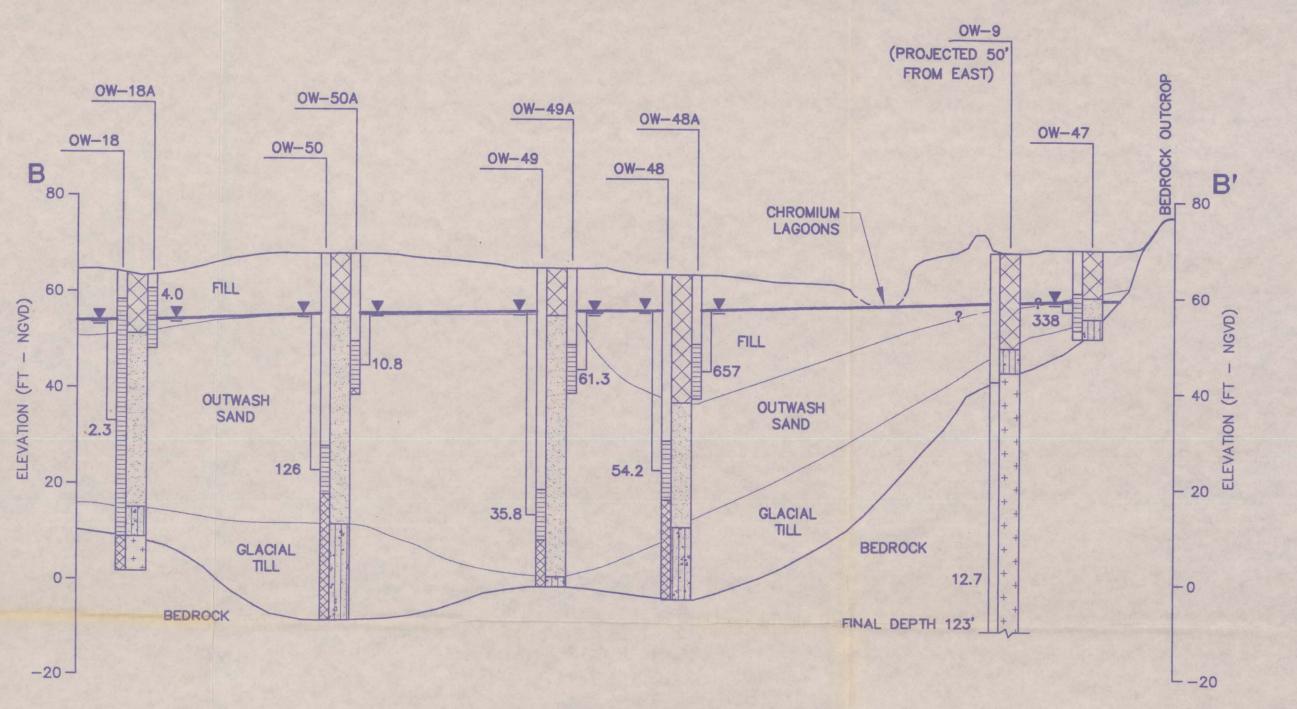
Explanation

N/R Not Reported

- Not Analyzed

- **A Quantitative Data**
- J Qualitative Data
- R Unusable Data
- U Chemical Parameter Not Detected
- UJ Chemical Parameter Not Detected, Detection Level Estimated
- F Field Data





WOOD CHIP PILE

OW-45

OW-45

SOIL PILE

OW-45

SOIL PILE

OW-45

FILL

FILL

FILL

OW-45

OW-45

OW-45

OW-45

FILL

OW-45

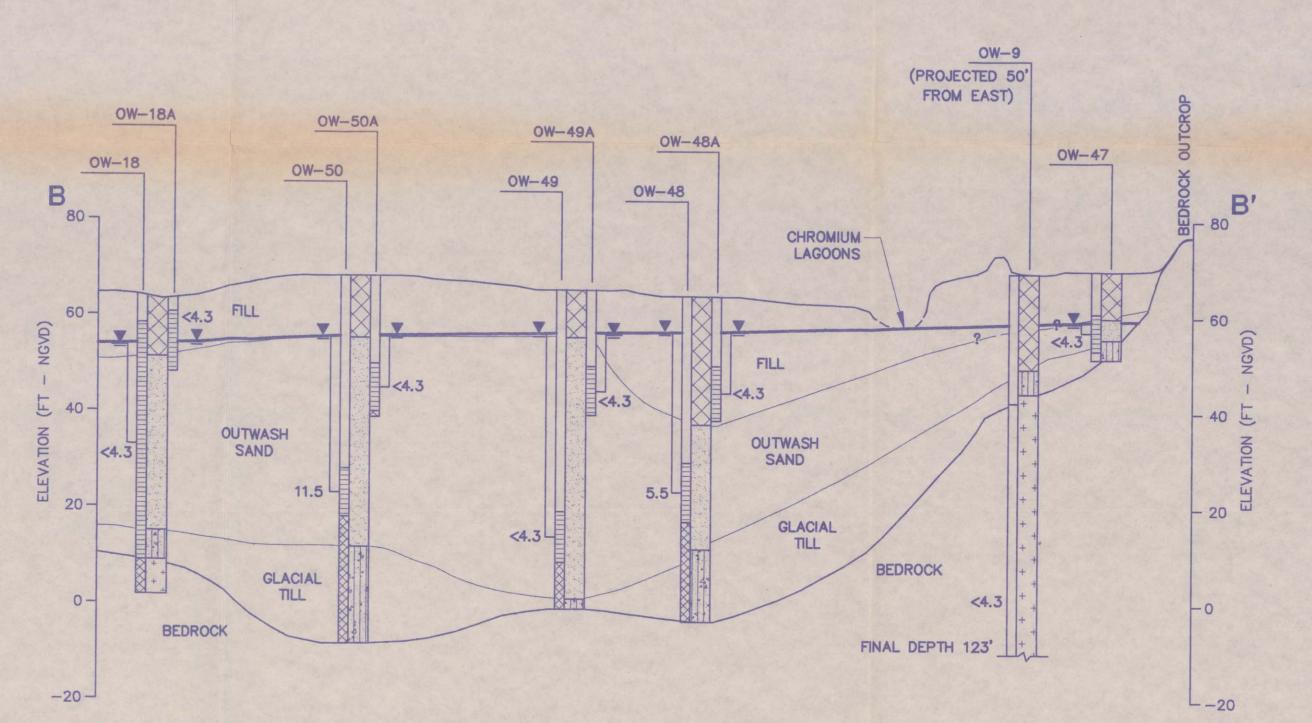
FILL

F

CROSS SECTION B-B'
CHROMIUM LAGOON AREA DISSOLVED ARSENIC

2

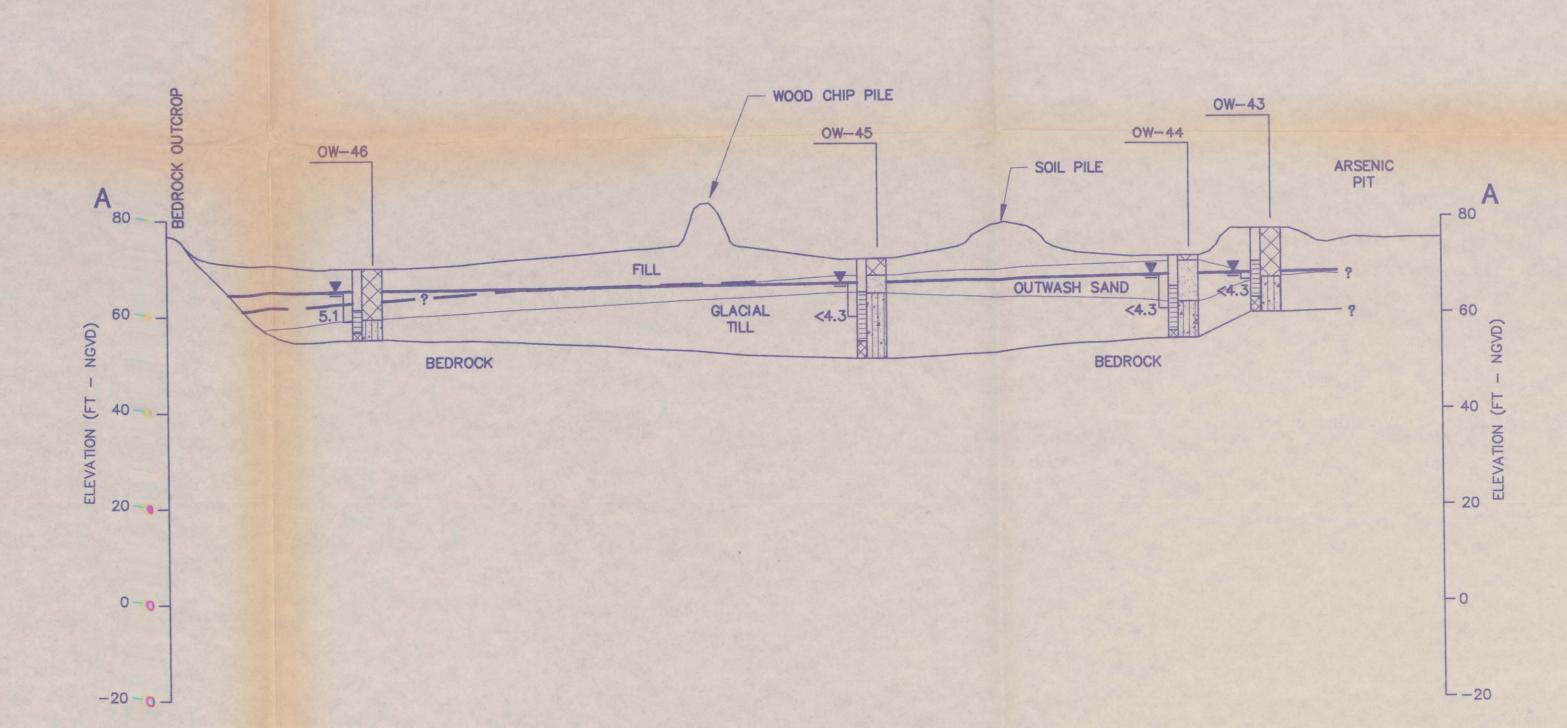
CROSS SECTION A-A'
ARSENIC PIT AREA DISSOLVED ARSENIC



CROSS SECTION B-B'
CHROMIUM LAGOON AREA DISSOLVED CHROMIUM

B

2



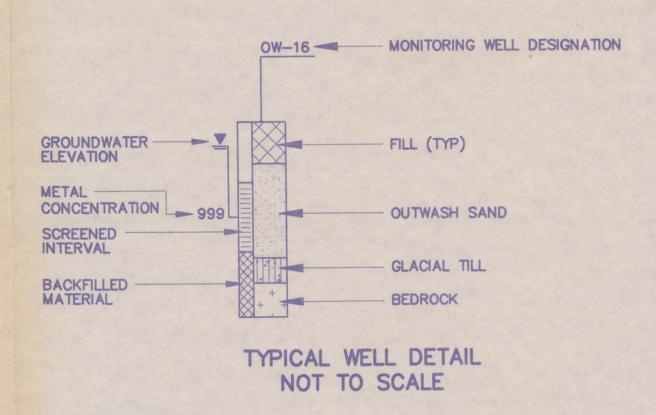
CROSS SECTION A-A'
ARSENIC PIT AREA DISSOLVED CHROMIUM

2

LEGEND

DETAIL/CROSS SECTION DESIGNATION

SHEET No. WHERE DETAIL/CROSS SECTION IS PRESENTED

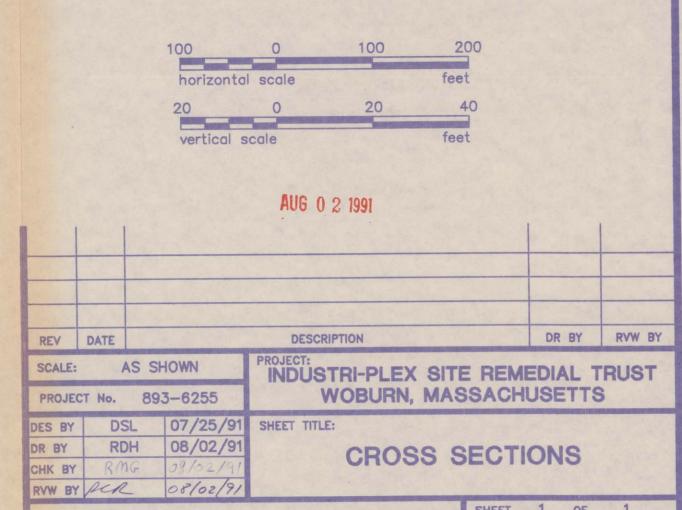


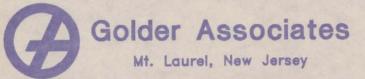
NOTES

1.) ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM (NGVD)
OF 1929, AND COORDINATES BASED ON MASSACHUSETTS COORDINATE
SYSTEM.

2.) GROUNDWATER MEASUREMENTS TAKEN ON 04/17/91 TO 04/19/91.

3.) OW-9 IS AN OPEN HOLE BEDROCK WELL. THE INTEGRITY OF THE CASING IS UNCERTAIN, THEREFORE THE WATER LEVEL ELEVATION HAS BEEN OMITTED.





SHEET 1 OF 1
FILE No. MA01-741

FIGURE 2

APPENDIX A Technical Procedures

1.0 PURPOSE

This technical procedure is to be used for installing single monitor wells in an unconsolidated deposit. This procedure assumes the borehole is stable or has been stabilized (kept open) with either auger flights or drive casing.

2.0 APPLICABILITY

This technical procedure is applicable to all Golder Associates Inc. personnel involved with installation of monitor wells.

3.0 DEFINITIONS

- 3.1 Monitor Well: A well completed within a zone of interest and of sufficient diameter to allow sampling and pump testing.
- 3.2 Bentonite: An expanding clay.
- 3.3 <u>Drive Casing</u>: A pipe used to line a borehole to prohibit caving and/or prevent direct flow from the formation into the borehole. Hollow stem augers may be considered as analogous in function to drive casing for the purposes of this technical procedure.
- 3.4 <u>Grout</u>: A cement mixture, originally fluid enough to flow through tremie pipes, used to seal casing within a borehole.
- 3.5 <u>Well Screen</u>: A wire-wrapped or slotted pipe which allows flow of water from the formation into the well
- 3.6 Monitoring Interval: The only zone in which groundwater can enter the well.

4.0 REFERENCES

- 4.1 Gibson, U.P. & Singer, R.D., 1971, <u>Water Well Manual</u>, Premier Press, California.
- 4.2 Anderson, K.E., 1979, <u>Water Well Handbook</u>, Missouri Water Well & Pump Contractors Assn., Inc. Missouri.

5.0 RESPONSIBILITY

- 5.1 <u>Field Engineer</u>: Field Engineers are responsible for well installation in compliance with this procedure.
- 5.2 <u>Task Leader</u>: Task Leaders shall be responsible for:
 - o Direct supervision of personnel drilling boreholes and making well completions;
 - o Assurance that equipment and material are available to permit accomplishment of the task;
 - o Review and approval of daily work reports; and
 - o The completion of drilling operations and well installation to the satisfaction of Golder Associates' standards of operation, and the client's requirements, and the requirements of any concerned regulatory agencies.
- 5.3 <u>Project Manager</u>: The Project Manager shall be responsible for:
 - o Selecting location of boreholes at the site and determining depth and details of completion of monitor wells;
 - o Selection and contracting of services of drilling subcontractors;
 - o Scheduling; and
 - Providing guidelines or specific work instructions for technical requirements beyond the scope of the applicable technical procedure.

6.0 EQUIPMENT AND MATERIALS

- o A drill rig of suitable design with all accessories, including a motor, compressor, rigging, and water pump;
- o Steam cleaner for cleaning drilling equipment between holes with associated wash/rinse solution storage tanks, brushes and contaminated solution capture equipment;
- o Hole stabilization equipment;

- o Ancillary equipment for drilling, including water truck and drive casing. Chemical characteristics (particularly of analytes of concern) need to be known for the water to be used down-hole;
- o High silica pea gravel or coarse sand (no carborate content) whichever is more appropriate for the formation materials;
- o Steel protective surface casing 8-inch diameter and 4-inch diameter, 8 foot long with at least 0.25 inch wall thickness. A lockable steel cap and locks that fit the 8 inch diameter casing are required;
- o Pure bentonite powder, compressed bentonite pellets,
 "Volclay", and/or "Pure Gold";
- o Pure bentonite slurry (approximately 2 lb. bentonite to 1 gal. of water) or "Volclay"/"Pure Gold" slurry (according to manufacturer's instructions);
- o Grout pump/mixer and tremie line;
- o Concrete (Portland Type I and II cement; water added at a ratio of 6 gallons per 94 lb sack);
- o Volclay grout powder; water shall be added at the ratio of 23 gallons per 48 lb. sack of Volclay or Pure Gold grout with 2 lbs of initiator (hardener);
- o Flush threaded well casing and end plug, preferably factory cleaned and sealed;
- o Flush threaded well screen with factory slotted with appropriate slot size. Should be factory cleaned and sealed;
- o History of Hole forms (Exhibit A);
- o Clipboard;
- o Indelible ink pens and felt tip markers;
- o Folding rule and tape measure;
- o Depth sounder:
- o Monitoring Well Installation Logs (Exhibit B);
- o Well centralizers, if appropriate, for formation and completion materials;
- o Turbidity meter; and

o Organic vapor analyzer (OVA) or monitor (OVM), if required due to site hazard.

7.0 PROCEDURE

7.1 Well Installation

The Project Manager shall decide on the total depth of a completed borehole. When the borehole has been drilled, sampled and stabilized to a total depth according to procedures in TP-1.2-5, the Project Manager shall decide the depth interval for monitoring. This procedure assumes that the borehole is stabilized with either drive casing or auger flights. All drill rods and drill bits must be removed from the borehole.

A single monitoring well shall be installed within the borehole. Figure 1 illustrates the construction details of a completed monitoring well (the diagram is not to scale). Wells shall be completed as follows:

- o The only portion of the completed well with well screens and a sand or gravel pack should be adjacent to the particular aquifer zone to be monitored.
- o All other sections, except within 5 feet of land surface, shall be sealed with a bentonite-type slurry that shall be tremie pipe pumped through to the appropriate locations or with bentonite pellets that shall be compacted in place.
- o The upper most 5 to 8 feet of the borehole annulus shall be filled with a cement grout for a surface seal and stability in freezing weather for protective surface monuments.

The Golder Field Engineer shall document all significant drilling events during the installation of each monitoring well each day on a History of Hole (Exhibit A) forms. The documentation shall include the time that the events occurred. Particular emphasis shall be placed on documenting the production hours and hours delayed in production with explanations. Notes on the weather conditions and drilling personnel shall also be recorded on the History of Hole form. During completion all backfilled materials and depths of well screens shall be sounded with a measuring tape with attached weight on the sounding end. Well completion details shall be recorded on the Monitoring Well Installation Log (Exhibit B) by the Field Engineer.

If the desired monitored interval is above the bottom of the borehole, the borehole must be backfilled with a low the manufacturer's permeability Volclay grout with initiator. The Volclay grout shall be tremie pipe pumped to the bottom of the borehole to about seven feet within the inside of the stabilizing steel casing or auger. The auger or steel casing shall be pulled or hammered out of the hole five feet. This procedure should be repeated until the bottom of the drive casing and top of the Volclay grout are equivalent to the bottom elevation of the desired monitoring The Volclay grout should be allowed to set prior to placing the gravel/sand pack and well casing/screen to establish a solid foundation. If the Volclay does not harden adequately to permit a firm foundation for supporting the well, then a cement/bentonite grout should be used and allowed to harden.

Volclay and/or cement grout should never be allowed to harden while the drive casing is in contact.

Before placing the well and screen the bottom of the monitored interval shall have one foot of gravel/sand pack. The screen and well casing shall be assembled while lowering. Care must be taken not to lose the well/screen down the borehole. If appropriate for the formation and completion materials, a well centralizer (correct size should be the width of the smallest diameter drive casing in which the well shall be installed) shall be placed on the bottom of the well screen and at a minimum of 40 feet intervals on the well casing. Augers with four inch inside diameter hollow stems do not need well centralizers. pipe must also be assembled and lowered simultaneously with the well casing and screen to avoid problems with the centralizers. Gravel/sand should be tremie piped, if possible, or poured down the annulus between the well and the drive casing. The gravel/sand pack shall be placed to a level no greater than one foot within the bottom of the drive casing. The drive casing shall be pulled up 1/2 foot and the position of the well casing and sand pack should be sounded. This process shall be repeated until the sand pack is three feet above the top of the well screen. The reason for raising the drive casing 1/2 foot at a time and for allowing one foot of sand pack inside the casing is to minimize the risk of sand locking the well screen with the drive casing.

Once the gravel/sand pack and well screen are in place, a bentonite pellet plug (minimum of 2 foot column) may be placed on top of the pack for sealing. The bentonite pellets are optional below the water table because the risk of the pellets could expand and lock the well casing to the drive casing. Any pellets added should not be allowed to settle within the bottom of the drive casing. This may be

difficult to impossible if the formation collapses immediately when the drive casing is pulled-up.

The remainder of the borehole annulus to within five to eight feet of land surface shall be filled with Volclay grout with the manufacturer's initiator. The sealant mixture shall be pumped into place with a tremie pipe. The interval of filling and pulling back casing should be the same as described in 8.1.5. Volclay grout shall never be allowed to harden while the drive casing is in contact. If the drive casing is being pulled-up easily and the encountered formation materials should not pose a problem pulling the casing, the repeat interval may be increased by approval of the Task Leader, but shall not be greater than 20 foot.

The borehole annulus from the surface to five (5) to eight (8) foot depth shall be cemented with a concrete mixture that is stable during freezing. This mixture can be poured from the surface. A six or eight inch diameter (0.25 inch wall thickness) protective steel surface casing shall be placed within the concrete to a depth of five feet and centered around the well casing. The top of the protective steel casing shall be more than one inch but less than six inches above the top of the well casing. The steel casing should extend about three feet above land surface. Gravel/sand shall be placed in the annulus between steel casings and the well casing and the steel casing. A hole shall be drilled near the bottom of the sand pack within the protective steel casings (just above the concrete) for draining any accumulated water. Around the outside of the protective steel casing and on the surface of the ground a sloped concrete pad shall be constructed to prevent surface water infiltration. A lockable cap shall be established on the protective steel casing that prevents precipitation from entering.

7.2 Well Development

The well shall need to be developed to remove soil/cutting within the well casing and improve hydraulic communication between the well screen and the monitored interval. Developing involves purging the well with a sand bailer/plunger to create a "in and out" motion of the water through the well and gravel/sand pack or sustained pumping at a high flow rate. The sand bailer shall remove gross amounts of sand and silt from the well. The fine suspended particles can be removed by air lifting water out of the well with the use of a compressor and tremie-pipe. Any air introduced from a compressor must be filtered to remove entrained oils. This process of surging and air lifting shall be repeated until the turbidity of the water is low to the satisfaction of the Task Leader or Field Engineer.

The purged water during well development must be captured. The water shall be tested for the presence of targeted contaminants. If targeted contaminants are not detectable, the water can be discharged to the most convenient locations. If targeted contaminants are detected, then the disposition of the contained fluids shall be as directed by the client.

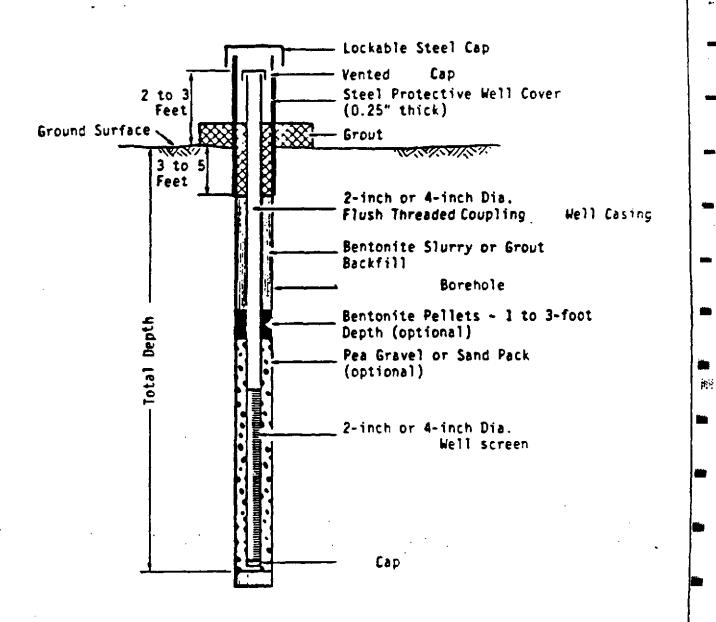
7.3 Precautions

All water used for mixing cement/grout/Volclay or used down hole must be chemically characterized, particularly for the analytes of concern for the site. The Task Leader must approve the water source before use. All bentonite and cement must be pure. Additives either contained in these materials or to be added to the mixture must be approved in writing by the Golder Project Manager. All well screens and well casings must be steam cleaned on site prior to installation and should be handled with clean gloves. The casing should not be allowed to touch the ground while installing a otherwise rinse with organic distilled/deionized water shall be used for rinsing prior to installation. All down hole drilling equipment must be decontaminated and cleaned prior to use for other boreholes or demobilized from the site. The decontamination includes steam cleaning. All wash solution shall be captured and tested prior to disposal. The disposal of fluids shall be as directed by the client.

7.4 Documentation

History of Hole sheets shall be prepared by the Field Engineer to record daily drilling activities and events. The Monitoring Well Installation Log shall be used to record the construction details of the monitoring well installation by the Field Engineer. Both the History of Hole and Monitoring Well Installation Log are considered field records for installing monitoring wells. Field records shall be made in triplicate at the work site and originals transmitted to the home office after completion of each well. A copy shall be given to the Task Leader and the Field Engineer retains the other copy for reference.

. All copies of field records shall be hand delivered to the home office upon completion of the field activities.



Note: Not to Scale

FIGURE

GENERALIZED SCHEMATIC DIAGRAM OF COMPLETED SINGLE WELL CONSTRUCTIONS

		Golder Associates HISTORY OF HOLE Job #		Sheet of
Geologist	Surface Elevatio	Date	Boring #	
Driller	Surface Elevatio	nWeather_		Temperature
Contractor	Orill Fluid	Dep	Cosing Size	Core Size_
BEG	INNING OF SHIFT		END OF SHIF	T
Time	Depth of Hole	Time Hr	s. Productive	🗕 Hrs. Delayed 🚣
Depth to WL	Depth to Casing	Depth of Hole	Depth of Cosing_	Depth to WL
				
				
				
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		· · · · · · · · · · · · · · · · · · ·		
				· · · · · · · · · · · · · · · · · · ·
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				والمراجعة والمستقول والمستوالية
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"TP-1.2-12" MONITORING WELL INSTALLATION LOG EXHIBIT R ____ PROJECT__ M WP.____ ---_ \$4040 ELEY _____ 94788 MEPTH_ --_ COLUM ELEY STARTED TOT / SAIL CHAPTER TOT / SAIL -----MATERIALS INVENTORY CASHS TIPE..... SENTRALIZEM ---... CONTRACTOR METHOD..... INSTALLATION NOTES ELEN /BEPTH BOIL /BOCK BESCRIPTION WELL SKETCH WELL DEVELOPMENT NOTES

59

Golder Associates

Page 1 of 7

1.0 PURPOSE

This technical procedure is to be used to establish a uniform procedure for installing monitor wells using hollow stem augering techniques.

2.0 APPLICABILITY

This technical procedure is applicable to all Golder personnel responsible for installation of monitor wells using hollow stem augering techniques.

3.0 DEFINITIONS

- 3.1 Monitoring Well. A well completed within a zone of interest and of sufficient diameter to allow sampling and pump testing.
- 3.2 Bentonite. An expanding clay.
- 3.3 <u>Well Casing</u>. A pipe used to line a borehole to prohibit caving and/or prevent direct flow from the formation into the borehole.
- 3.4 Grout. A cement mixture which is originally fluid enough to flow through tremied pipes. It is used to seal casing within a borehole.
- 3.5 <u>Well Screen</u>. A perforated or slotted pipe which allows flow of water from the formation into the borehole.

4.0 REFERENCES

- 4.1 Gibson, U.P. & Singer, R.D., 1971, <u>Water Well Manual</u>, Premier Press, California.
- 4.2 Anderson, K.E., 1979, <u>Water Well Handbook</u>, Missouri Water Well & Pump Contractors Assn., Inc., Missouri.

5.0 RESPONSIBILITY

5.1 <u>Each Field Engineer</u> installing monitor wells shall be responsible for compliance with this technical procedure.

5.2 <u>Each Task Leader</u> shall be responsible for:

- Selection of borehole locations at the site and determining depth and details of completion of monitor wells:
- o Direct supervision of personnel drilling boreholes and making well completions;
- o Assurance that equipment and material are available to permit accomplishment of the task;
- o Selection and contracting of services of drilling subcontractors;
- o Scheduling;
- o Providing guidelines or specific work instructions for technical requirements beyond the scope of the applicable technical procedure;
- o Review and approval of daily work reports; and
- o The completion of drilling operations, and well installation to the satisfaction of the Client, and other regulatory bodies as applicable.

6.0 EQUIPMENT AND MATERIALS

- o A hollow stem drill rig of suitable design with all accessories, including a motor, rigging, and water pump to provide optimum penetration of insitu materials;
- o Steam cleaner, cleaning brushes and cleaning solutions for cleaning drilling equipment between holes:
- o Hole stabilization equipment;
- o Generally required drilling accessory equipment, including water truck and casing;
- o Pea gravel or coarse sand;
- o Bentonite powder and/or Bentonite compressed pellets;
- o Bentonite slurry (approximately 2 lb. bentonite to 1 gal. of water) mixing equipment;
- o Grout pump/mixer;

- o Grout (pure bentonite or 4-5% bentonite in Portland cement, as required);
- o 2-inch or 4-inch nominal inside diameter casing;
- o Well screen (2-inch or 4-inch, flush threaded). Slot size should be appropriate for soil conditions at the monitored interval;
- o History of Hole forms;
- o Clipboard;
- o Field Borehole Logs and Field Well Completion forms;
- o Folding rule;
- o Depth Sounder; and
- o Teflon tape, if necessary.

7.0 PROCEDURE

Drilling will proceed with a "hollow-stem augering" method. The first section of the auger flights shall be equipped with a drill-bit. All drilling equipment will be steam cleaned between boreholes.

Relevant events shall be documented on the History of Hole Form (Exhibit A). The Field Engineer will sample drill cuttings and make recordings of penetrated materials on the Field Borehole Log (Exhibit B). After intercepting the water table, the Field Engineer will estimate and record the depth of the water table.

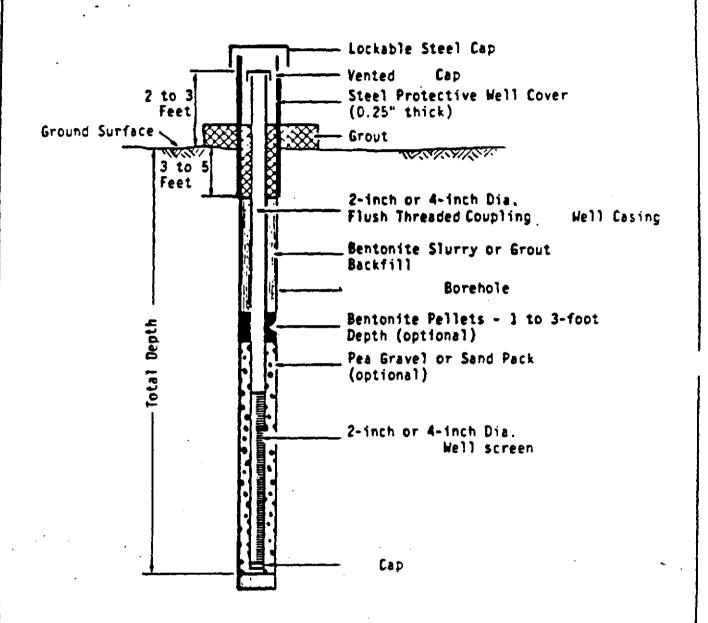
During drilling or well installation, fluids and/or additives to either assist in cuttings removal or for borehole stability shall not be used. Before any fluid and/or additives are used, written approval must be obtained from the Task Leader.

Hole locations may be changed as a result of initial findings. When the hole has been drilled to the total depth, the wells will be constructed as shown in Figure 1. No glues or solvent shall be used on the well casing or screens. Teflon tape shall be used on threaded couplings only if recommended by manufacturer. All steel will be removed from the borehole that is adjacent to well screens.

Page 4 of 7

When the well is completed, the only section (interval) of the completed well which has well screens and a sand and gravel pack will be adjacent to the particular aquifer zone to be monitored. All other sections will be sealed with a bentonite grout or slurry that will be tremie pipe pumped through to the appropriate locations or with bentonite pellets that will be compacted in place. The uppermost 3 to 5 feet of the borehole annulus will be filled with a cement grout. During completion, all backfilled materials and depths of well screens will be sounded with a measuring tape with attached weight on the sounding end. The final construction details will be recorded on the Field Well Completion Log.

The hole will be developed to enhance communication with the formation. The Field Engineer shall determine when adequate well development has been achieved. An adequately developed well should not have a clogged screen and yield relatively turbid free groundwater that is representative of the natural turbidity at the formation. If the development water is contaminated, then the water shall be captured and disposed of in compliance with the client's directions or the requirements of the QA project plan.



Note: Not to Scale

FIGURE 1
GENERALIZED SCHEMATIC
DIAGRAM OF COMPLETED
SINGLE WELL CONSTRUCTIONS

Golder Associates HISTORY OF HOLE Job

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"TP-1.2-12" MONITORING WELL INSTALLATION LOG EXHIBIT R - 1670 45714 STARTED THE T GAME T GAME . MILL IN. MATERIALS INVENTORY ---SOIL /EDCA BESCRIPTION WELL SKETCH INSTALLATION NOTES ELEV/SEPTH 0.0 WELL DEVELOPMENT NOTES

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1.0 PURPOSE

1.1 This technical procedure is to be used to establish a uniform procedure for measuring water levels in drill holes and piezometers.

2.0 APPLICABILITY

2.1 This technical procedure is applicable to all personnel measuring water levels.

3.0 DEFINITIONS

3.1 <u>Electric Water Level Sounder (EWS)</u>. An instrument for measuring water levels in boreholes. An EWS is essentially an open circuit involving an ammeter and battery mounted on a reel on which insulated two-wire electric cord (calibrated by length) is wound. The circuit is closed when the exposed ends of the two wires are immersed in water. Current flow is registered on a meter on the reel.

4.0 REFERENCES

4.1 Cooley, R.L., et al, 1972, Hydrologic Engineering Methods for Water Resource Development, Vol. 10-Principles of Groundwater Hydrology, Section 6.01, U.S. Army Corps of Engineers (HEC-IHD-1000)

5.0 DISCUSSION

5.1 None

6.0 RESPONSIBILITY

6.1 <u>Field Engineer/Geologist</u>: Responsible for measurement in compliance with this technical procedure.

6.2 Task Leader: Responsible for:

- Direct supervision of personnel taking the measurements
 - Assurance that equipment and material are available to permit accomplishment of the task

7.0 EQUIPMENT AND MATERIAL

- 7.1 Electric water-level sounder or measuring tape with a wettable surface.
- 7.2 Folding rule.
- 7.3 Field notebook or appropriate Water Level Reading forms (Exhibit A).

- 7.4 Data on well identification number and locations.
- 7.5 Spare battery for electric water-level meter.
- 7.6 Indelible ink pens

8.0 PROCEDURE

- 8.1 Record well identification number and measuring device type and serial number.
- 8.2 Each water level sounder or measuring tape used for recording water levels shall have the depth graduations checked with an independent folding rule or measuring tape for calibration prior to field use.
- 8.3 Clean all downhole instruments and equipment before and after measurements between wells. Cleaning shall be with a non-phosphate detergent rinse followed by a rinse with approved tap water, then rinse with organic free distilled/deionized water.
- 8.4 Measure and record distance from ground level to top of casing or standpipe. Measure the vertical distance from the top of casing or standpipe to the point of the elevation survey mark (if different from top of casing or standpipe).
- 8.5 If an EWS is used, turn on the EWS, check the battery, lower the wire into the borehole or standpipe and stop at the depth where the EWS meter indicates a completed circuit. Record the length of the wire below the casing collar or top of the standpipe to the nearest 0.01 foot.
- 8.6 If a measuring tape is used, lower the tape (with a weight attached) into the borehole. The tape must be lowered a sufficient depth into the well to ensure the wettable surface section of the tape is partially submerged. The total length of the tape within the well (from the top of casing or standpipe) and the length of the wetted surface to the submerged end of the tape shall be recorded.
- 8.7 Record date, time, well designation, measuring device and all measurements on a Water Level Readings Form (Exhibit A) in triplicate. The personnel making the measurement shall initial or sign each measurement recorded. All water level measurement records shall be maintained in the project records files.

RECORD OF WAIZR LEVEL READINGS

Bore- Hole No.	Date	Tine	Measuring Device/ Serial No.	Measurement Point (M.P.)	Vater Level below M.P.	Correction to Survey Mark	Survey Hark Elevation	Vater Level Elevation	Ву	: Comments
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STANDARD OPERATING PROCEDURE FOR SAMPLING GROUND-WATER MONITORING WELLS

1.0 MATERIALS AND EQUIPMENT

- 1.1 The following items may be required for monitoring well sampling and data collection:
 - a. Appropriate bailer(s) for test substances.
 - b. Non-absorbent cord (e.g., polypropylene).
 - c. Pre-measured plastic bucket(s).
 - d. Plastic sheets.
 - e. m-scope
 - f. Tape measure (steel tenth of a foot measurement increments) and chalk.
 - g. Pen knife.
 - h. Field forms/Field notebook.
 - i. Well location map.
 - j. Cleaning agents (detergent, distilled or deionized water, potable water).
 - k. Pump (if purging required) and associated materials such as:
 - 1. Teflon tape.
 - 2. Appropriate tubing (e.g., polyethylene) if using peristaltic pump.
 - 3. Portable generator if using submersible pump.
 - 1. Water Well Handbook.
 - m. Calculator.
 - n. Hard hat (if required on location).
 - o. pH meter.
 - p. Conductivity meter.
 - q. Thermometer.
 - r. Paper towels, clean rags.
 - s. Black pen and pencil.
 - t. Wet ice and/or blue packs.
 - u. Sample jars, codes, and labels.
 - v. Electrical tape.
 - w. Pipe wrench.
 - x. Screwdriver, hammer.
 - y. Cooler(s).
 - z. Water jugs.
 - aa. Disposable gloves
 - bb. Well keys.
 - cc. Masking and packing tape.
 - dd. Water-proof marker.
 - ee. Well sampling form(s).
 - ff. Non-phosphate, laboratory-grade detergent.
 - gg. Distilled/deionized water.
 - hh. Chain-of-custody form(s).
 - ii. Custody seal(s).
 - jj. Extra batteries (meters, thermometer).
 - kk. Buffer/calibration solutions.

2.0 PROCEDURE

- 2.1 Once the wells are in place, and properly developed, ground-water samples will be taken for water-quality analyses.
- 2.2 Make sure all equipment is decontaminated, cleaned, and calibrated before use and document daily activities in the field notebook.
- 2.3 Document well identification and pre-sampling information in the field notebook as needed.
- 2.4 Inspect the protective casing of the well and note any items of concern such as a missing lock or bent casing. Complete the Well Inspection Checklist.
- 2.5 Place plastic sheeting around the well to protect sampling equipment from potential contamination.
- 2.6 Remove the well cap or plug and clean the top of the well off with a clean rag. Place the cap or plug on plastic.
- 2.7 Measure the depth to water using an electronic probe (m-scope) or steel tape and chalk. Document in the field notebook.
- 2.8 Measure the depth of the well with the steel tape or obtain from construction diagram. Calculate and record the volume of water in the well in the field notebook.
- 2.9 Prior to sampling, the well should be pumped or bailed to remove a minimum of three casing volumes if the recharge rate is adequate to accomplish this within a reasonable amount of time. The well should not be pumped or bailed dry. If the well produces little water, at least one well volume must be purged. The well will be sampled after the water level has stabilized.
- 2.10 Record the temperature, pH, conductivity, and physical appearance of the water in the field notebook (e.g., color, turbidity, odor, etc.) as it is pumped or bailed, a minimum of three times.
- 2.11 If the bailer has not been decontaminated, decontaminate it according to the procedures described previously. If the bailer has been decontaminated, flush it several times with distilled/deionized water, and collect and discard (in an appropriate manner) three bails of well water before collecting the sample.
- 2.12 Using a non-absorbent cord (e.g., polypropylene), lower the bailer into the well.
- 2.13 Quality-control samples will be used to monitor sampling and laboratory performance and will include replicates, and blanks, spikes.
 - a. Replicate analysis is done to check on samples reproducibility. The procedure to be used for taking replicate samples follows. If samples are

collected for volatile organic compound (VOC) analysis, then the water from the bailer will be distributed first to fill one VOC container and then to fill the second VOC container. Adequate water will be available to fill both of the bottles completely before they are capped. A replicate sample will be collected every 20 samples at a minimum.

- b. Trip blank analysis is performed to detect if contamination has occurred during field handling, shipment, or in the laboratory. A trip blank is a container that is filled with distilled/deionized water in the laboratory, and travels unopened with the sample bottles. It is opened in the laboratory and analyzed along with the field samples for the constituent of interest.
- c. Equipment blank analysis provides a check on sampling procedures. An equipment blank is made with distilled/deionized water by exposing it to the sampling processes (e.g., bailer). The clean water will be poured into the bailer (which has been decontaminated and is ready for sampling) and then into the sampling container. A field blank will be collected every 20 samples at a minimum.
- d. A matrix spike, which is performed in the laboratory, is a check on the laboratory's ability to recover the matrix. Spikes of standard compounds may be added to samples in the laboratory to determine if the ground-water constituents are interfering with test substance identification or quantification. Such analyses may also point to systematic errors and lack of sensitivity of analytical equipment. A matrix spike and replicate matrix spike will be collected every 20 samples at a minimum.
- 2.14 Place samples in the pre-labeled containers and store on ice (wet ice or blue packs).
- 2.15 After sample collection is complete, measure and record the temperature, conductivity, pH, and physical appearance of the water, and record in the field notebook.
- 2.16 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cap.
- 2.17 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," and placed in its appropriate container (holder) in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the laboratory.
- 2.18 Complete the Chain-of-Custody forms. One copy of the Chain-of-Custody form is retained. Secure the cooler with sufficient packing tape and a Custody Seal. Forward the samples via overnight (express) mail or hand deliver to the designated laboratory preferably within 24 hours but no later than 48 hours after sampling. Notify the laboratory that samples have been shipped, and make special arrangements if Saturday delivery is necessary.

2.19 Decontaminate bailers, hoses, and pumps as discussed in the decontamination section. Wrap decontaminated equipment with a suitable material (e.g., aluminum foil). Discard the cord, rags, gloves, etc. in a manner consistent with the Health and Safety Plan.

STANDARD OPERATING PROCEDURE FOR FILTRATION OF WATER SAMPLES FOR DISSOLVED METALS ANALYSES

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to describe the considerations and procedures for the field filtration of water samples for dissolved metals analyses prior to sample preservation. Filtering is implemented when the water sample originates from a medium-grained to fine-grained porous geologic formation that contains suspended fine-grained materials (fines) that cannot be prohibited from entering the water sample by well development or well design. Since fines are not always distinctly visible in a water sample, all water samples will undergo filtration.

It should be noted that filtration of water for metals analyses has been a standard practice with the United States Geological Survey (USGS) for many years. Within this framework, filtration refers to the filtering of water either directly or at the end of a filtration series through a 0.45 micrometer (micron) membrane filter (i.e., the presence of a large quantity of fines may require the prefiltering of the sample with a larger-size[s] membrane filter[s] prior to the 0.45 micron filter to avoid clogging the 0.45 micron filter using an exorbitant amount of time to filter).

Filtration will be done as soon as possible after a water sample is collected, preferably at the same time that the water is produced. The filtering equipment and membrane will be suitable for the intended analysis.

2.0 MATERIALS/EQUIPMENT

- 2.1 In order to field filter water samples, specific equipment and materials will be required. The equipment and materials needed for field filtering will include the following:
 - a. Non-phosphate, laboratory-grade detergent.
 - b. Distilled/Deionized water.
 - c. Potable water.
 - d. Roux Associates field forms (e.g., Daily Log, Sampling, etc.)/field book.
 - e. Filtration apparatus (e.g., Gelman apparatus, Buchner funnel, etc.), filters, pre-filters.
 - f. Placticware (e.g., pre-measured buckets, beakers, flasks, funnels).
 - g. TeflonTM tape.
 - h. Vacuum pump (e.g., manual/hand-operated or electric).
 - i. Appropriate tubing.
 - j. Disposable gloves.
 - k. Sample jars with appropriate preservative (e.g., Nitric acid) and labels.

3.0 DECONTAMINATION

- 3.1 Decontamination procedures for filtering equipment follow:
 - a. Wear disposable gloves while cleaning filtering equipment to avoid contamination and change gloves as needed.
 - b. Prepare a non-phosphate, laboratory-grade detergent solution and distilled or deionized water in a bucket.
 - c. Remove vacuum tubing from flask.
 - d. Remove filter membrane from funnel.
 - e. Disassemble filtering apparatus (flask and funnel) and scrub each piece of equipment with a brush and solution.
 - f. Rinse with potable water.
 - g. Rinse with copious amounts of distilled or deionized water.
 - h. Rinse with dilute, trace-metal analysis-grade Nitric Acid triple rinse with distilled water.
 - i. Air dry.
 - j. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

4.0 PROCEDURE

- 4.1 Ensure that the filtering equipment is properly decontaminated before use.
- 4.2 Assemble the filtering apparatus (funnel and flask), and connect the vacuum pump.
- 4.3 Place a clean (new) 0.45-micron pore-size filter in the funnel. Use larger, pore-size filters if prefiltering is required (i.e., if suspended sediment is present that would quickly clog the 0.45-micron filter and prevent continuous filtration).
- 4.4 Obtain the water sample using an appropriate, decontaminated sample-collection device (e.g., bailer, pump jar).
- 4.5 Pass the unpreserved water sample through the prefilter, if needed, and the 0.45-micron filter into the flask. Apply a vacuum using the vacuum pump, if needed, to facilitate filtering.

2 450 mg 02 22

4.6 Transfer the filtered water sample to the appropriate, pre-labeled sample container containing the preservative (e.g., Nitric Acid) being careful not to overfill the container and dilute the preservative.

- 4.7 Follow standard operating procedures for sample documentation, shipping, and tracking (i.e., record keeping) as defined in the FSP and QAPjP.
- 4.8 Decontaminate the filtering equipment that came in contact with the water sample.

APPENDIX B
Soil Boring Logs

DRILLER: JRM

RECORD OF BOREHOLE OW-43

BORING DATE: 04/01/91

SHEET: 1 OF 1

DATUM: MSL

DATE: 04/01/91

PROJECT LOCATION: WOBURN PROJECT NUMBER: 893-6255

BORING LOCATION: N:553,983.40 E:696,106.60

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		5.5-10.0 ft. Loose brown-orange c-f SAND, tr. silt (SP). <fill></fill>			5.50	S-2	SS	1,1,1	2	67						
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				₩	64.60											
0		10.0-17.0 ft. V. Dense, olive green grev c-f SAND, tr. silt. little -			64.60 10.00											
		10.0-17.0 ft. V. Dense, olive green grey c-f SAND, tr. silt, little - tr. gravel (SP). <glacial till=""></glacial>		3 3		S-3	SS	41,50,90	<100	67			İ			
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Golder Associates

RECORD OF BOREHOLE OW-44

BORING DATE: 04/11/91

SHEET: 1 OF 1

DATUM: MSL

PROJECT LOCATION: WOBURN PROJECT NUMBER: 893-6255

BORING LOCATION: N:553,902.30 E:696,123.80

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5		1.3-9.8 ft. Loose to compact c-f light brown SAND, trace sift (SP). <outwash sand=""></outwash>	SP	75.17 75.17 75.17 75.17		S-2	SS	2,2,3	5	100	•					
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10	6-5/8'X10" HSA	9.8-17.0 ft. Very Dense olive gray c-f	_		59.50 9.80											
		SAND and c-f GRAVEL, trace silf (SP). <glacial till=""></glacial>		0.00.00.0		S-3	SS	30,40,28	68	100						
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		CONTRACTOR: D.L. Maher J.A.G.				,	.	er Associat							KED: RA 04/11/9	

Golder Associates

RECORD OF BOREHOLE OW-45

BORING DATE: 04/08/91

SHEET: 1 OF 1

DATUM: MSL



PROJECT LOCATION: WOBURN
PROJECT NUMBER: 893-6255

BORING LOCATION: N:653,581.50 E:696,162.50

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		0.6-3.9 ft. Construction waste: concrete, brick. <fill></fill>			65.50		-									
5		3.9-7.2 ft. Compact brown c-f SAND, some c-f gravel, little sift (SP-SM). <outwash sand=""></outwash>	SP-SM		3.90	0.0					=					
					62.20	S-2	88	1,5,8 *	13	33	-					
0	HSA	7.2-20.5 ft. Very dense c-f multi-compositional GRAVEL and c-f olive gray SAND, trace silt (GP). <glacial till=""></glacial>		£0,20,20,20,20,20,20,20,20,20,20,20,20,20	7.20											
Ĭ	6-5/8"x10" HSA			.0.0.0.0.0.0.		S-3	5 5	18,37,50	67	67					•	
			GP	0-0-0-0-0-0												
5				02020 1020		5-4	SS	8,37,50	87	73					•	
				0.0.0.0.0												
				0,0,0,0,0	48.90											
I		AUGER REFUSAL - BORING TERMINATED AT 20.5' BELOW GROUND SURFACE.		P1 V 1	20.50					:						
											:					
5																
۰			٠				}								:	
	٠															
5	:															
												i				
О																

DRILLING CONTRACTOR: D.L. Maher

DRILLER: JAG

Golder Associates

LOGGED: MRS
CHECKED: RMG
DATE: 05/01/91

RECORD OF BOREHOLE OW-46

BORING DATE: 03/26/91

SHEET: 1 OF 1

DATUM: MSL

PROJECT LOCATION: WOBURN PROJECT NUMBER: 893-6255

BORING LOCATION: N:653,059.90 E:696,119.20

,	Q	SOIL PROFILE			**	1		SAMPLES			PENETRATION RESIST		
FEET	BORING METHOD	DESCRIPTION	nscs	GRAPHIC LOG	ELEV DEPTH	NUMBER	турЕ	BLOWS / 6 in	N	REC/ATT	BLOWS/FT 80 80	BO 1	PIEZOMETER OR STANDPIPE INSTALLATION
٥		0.0-2.5 ft. V. dense, pale brown, c-f SAND, little gravel, trace silt (SP). <fill></fill>	SP		68.20 0.00	S-1	88	7,11,100	k100	33		•	
5		2.5-7.5 ft. Compact, pale brown-gray c-I SAND trace silt, (SP). < FILL >	SP		65.70 2.50								
					60.70	5-2	\$8	7,11,8	19	86			
	8'x12' HSA	7.5-10.5 ft. Compact, dark purple f-m SAND and SILT (SM). <fill></fill>	SM		7.50								
0		10.5-12.5 ft. Compact, gray f-m SAND and SILT (SM). <glacial till=""></glacial>	SM	20 to 10	57.70 10.50	S-3	SS	5,10,14	24	66			
		12.5-15.0 ft. V. Dense, olive green-gray f-m SAND, little silt, some GRAVEL (SP). <glacial till=""></glacial>	SP	enenene eogogogogogogogogog	55.70 12.50								
.5		AUGER REFUSAL - BORING TERMINATED AT 14.50' BELOW GROUND SURFACE.			53.20 15.00	S-4	SS	38,95,100	<100	66			
0													
15													
						:							
٥													
5					ł								
$\Big $													
°													

DRILL RIG: Brat 22R DRILLING CONTRACTOR: D.L. Maher

DRILLER: JRM

Golder Associates

LOGGED: DSL CHECKED: RMG

DATE: 03/26/91

RECORD OF BOREHOLE OW-47

PROJECT LOCATION: WOBURN

BORING DATE: 03/18/91

SHEET: 1 OF 1

DATUM: MSL



PROJECT NUMBER: 893-6255 BORING LOCATION: N:662,754.20 E:695,165.30

ן ני	Q	SOIL PROFILE		1	,			SAMPLES			PENETRATION R BLOWS	FT 🛢	pue 7-1 - 2-2
PEET FEET	BORING METHOD	DESCRIPTION	SOSA	GRAPHIC LOG	ELEV DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	WATER CONTENT, Way 40	PERCENT WI 80 80	PIEZOMETER OR STANDPIPE INSTALLATION
٥		0.0-0.6 ft. Loose brown c-f SAND, some sit, some f gravel, root mass, (SM). 0.6-1.4 ft. Dense gray c-f GRAVEL, some c-f sand, trace sitt, cobbler present (GP). 1.4-2.5 ft. Purple c-f SAND, some sitt (SM). 5.0-9.0 ft. Stiff white CLAY, (CH).	SM		67,80 0.00	S-1	96	3,23,10	33	53	•		
5	HSA				58.80		88	12,33,27	60	100			
10	8*x12" HSA	9.0-14.0 ft. Compact olive gray m-f SAND, little black silt, abundant muscovite flakes, (SP-SM). < OUTWASH SAND>	SM		9.00	S-3	SS	4,10,13	23	87			
15		14.0-18.0 ft. V. dense orange to olive gray SAND and GRAVEL, trace silt (SP). <glacial till=""></glacial>	SP	2020202020	53.80 14.00	S-4	88	20,70,75	<100	100			
20		AUGER REFUSAL - BORING TERMINATED AT 18.00' BELOW GROUND SURFACE.		3 E	49.80 18.00								
25													
35													
40					:								

DRILLING CONTRACTOR: D.L. Maher

DRILLER: JRM

Golder Associates

CHECKED: RMG

DATE: 03/18/91

RECORD OF BOREHOLE OW-48

BORING DATE: 03/21/91

SHEET: 1 OF

DATUM: MSL

DATE: 03/20/91

PROJECT LOCATION: WOBURN PROJECT NUMBER: 893-6255

BORING LOCATION: N:552,337.60 E:696.264.50

PENETRATION RESISTANCE SAMPLES SOIL PROFILE DEPTH SCALE FEET BORING METHOD BLOWS/FT ■ 60 20 40 60 OFI STANDPIFE NUMBER ELEV **NSCS** DESCRIPTION BLOWS / N WATER CONTENT, PERCENT INSTALLATION 40 6 in DEPTH 60 0.0-0.4 ft. Compact brown c-f SAND and GRAVEL, little slit, root mass (SP-SM). 0.44 **S**-1 SS 5,27,11 38 27 0.4-4.5 ft. Compact cobble and boulder fill. <FILL> 58.50 4.50 4.5-26.5 ft. Loose brown to black c-f SAND, little c-f gravel, little silt; organics, wood, hides, burlap present (SP-SM). <FILL> 98 8-2 7,4,3 7 77 10 5-3 SS 5,3,2 5 33 15 **S**S 1,3,3 6 13 Ę 20 8*x12* S-5 SS 6,4,4 8 40 25 8,4,3 20 26.5-52.5 ft, Loose to dense gray-beige c-f SAND, trace f. gravel, trace sitt (SP). < OUTWASH SAND> 30 15,22,10 S-7 **S**S 32 73 SP 35 S-8 **5**\$ 4,3,6 9 53 DRILL RIG: Brat 22R LOGGED: DRILLING CONTRACTOR: D.L. Maher CHECKED: RMG DRILLER: JRM **Golder Associates**

RECORD OF BOREHOLE OW-48

BORING DATE: 03/21/91

SHEET: 2 OF 2

DATUM: MSL

DATE: 03/20/91

PROJECT LOCATION: WOBURN
PROJECT NUMBER: 893-6255

DRILLER: JRM

BORING LOCATION: N:552,337.60 E:696,264.50

BORING METHOD	DESCRIPTION	SOSA	ဗို	l					ŀ	2	ດ 🖥	LOWS/F	0 E	10	PIEZOMETER
		ğ	GRAPHIC LOG	DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT		ER CON	TENT, PI	ERCENT) (0	OR STANDPIPE INSTALLATION
	26.5-52.5 ft. Loose to dense gray-beige c-f SAND, trace f. gravel, trace silt (SP). < OUTWASH SAND>		12.12 12.12 12.12 12.13	23.00 40.00		98	6,22,15	37	40		•				
					S -10	88	2,2,4	6	40	=					
		SP													
				10.50	S-11	SS	4,4,12	16	53					:	
6 XIZ HS	52.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sift (SP). <glacial till=""></glacial>		0-0-0-0-0 0-0-0-0-0	52.50											
	•		0.00000 1.00000		S-12	88	32,32,25	57	40			=			
		SP	702020202020												
ľ			0.00.00 0.00.00		S-13	\$ \$	10,7,23	30	27		-	<u>}</u>			
	64.0-66.25 ft. Very dense gray-black		9.02.02 0.02.02 0.00.00	-1.00 64.00											
		GΡ	00000	-3.25	S-14	SS	46,56,50	<100	48						
	AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE.			66,25											
						and the second s									
											:				
	Time the second	52.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sit (SP). <glacial till=""> 64.0-66.25 ft. Very dense gray-black angular GRAVEL, trace silt (GP). <weathered bedrock="" fragments=""> AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE.</weathered></glacial>	64.0-66.25 ft. Very dense gray-black angular GRAVEL, trace silf (GP). <weathered bedrock="" fragments=""> AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE. Brat 22R</weathered>	52.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sift (SP). GLACIAL TILL> 64.0-66.25 ft. Very dense gray-black angular GRAVEL, trace sift (GP). WEATHERED BEDROCK FRAGMENTS> AUGER REFUSAL BORING TERMINATED AT 66.25' BELOW GROUND SURFACE.	52.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sit (SP). GLACIAL TILL> 64.0-66.25 ft. Very dense gray-black angular GRAVEL, trace sit (GP). WEATHERED BEDROCK FRAGMENTS> AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE. 66.25 Brat 22R	SP S.11 52.5-84.0 ft. Dense to very dense olive gray SAND, some gravel, trace sift (SP). GLACIAL TILL.> 52.5-84.0 ft. Dense to very dense or servel, trace sift (SP). GLACIAL TILL.> 52.5-84.0 ft. Dense to very dense or servel, trace sift (SP). SP 32.5-84.0 ft. Dense to very dense or servel, trace sift (SP). SP 32.5-84.0 ft. Dense to very dense or servel, trace sift (SP). SP 32.5-84.0 ft. Dense to very dense or servel, trace sift (SP). SP 32.5-84.0 ft. Dense to very dense or servel, trace sift (SP). SP 32.5-84.0 ft. Dense to very dense or servel. SP 32.5-84	\$2.5-84.0 ft. Dense to very dense olive gray \$AND, some gravel, trace sift (\$P). GIACIAL TILL.> \$9.12 \$8 \$9.13 \$8 \$1.00 \$64.0-66.25 ft. Very dense gray-black angular GRAVEL trace siff (\$P). <weathered bedrock="" fragments=""> AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE. Brat 228</weathered>	\$2.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sit (SP). GLACIAL TILL> 64.0-66.25 ft. Very dense gray-black angular GRAVEL, trace sit (GP). AUGER REFUSAL - BORING TERMINATED AT 66.25' BELOW GROUND SURFACE.	\$2.5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace silt (SP). SILACIAL TILL SILACIAL SILACIA SILACIAL SILACIA SILACIA SILACIA SILACIA SILACIA SILACIA SILACIA SILACIA SILACIA SIL	SP S-11 SS 4,4,12 18 53	\$2.5-64.0 ft Dense to very dense olive gray SAND, some gravel, trace sit (SP). CELACIAL TILL.> \$1	\$2.5.64.0 ft. Dense to very dense olive gray-et, trace alit (SP). GLACIAL TILL> 64.0-66.25 ft. Very dense gray-black angular GRAVEL trace slif (SP). GVEATHERS DECROPS PERAMENTS OF SELECTION OF SELE	S2-5-64.0 ft. Dense to very dense olive gray SAND, some gravel, trace sing 1972. GLAC-64.2 ft. Very dense grav-black angular GRAVEL trace sing (GP). WEATHERED BEDROCK FRAGMENTSD CP S S S S S S S S S S S S S S S S S S	S2-540 ft Danse to very dense place of the p	S2-5-64 0 ft. Dense to very dense clivery dense clivery dense clivery sAND, some gravel, trace sint (SP). GLACIAL TILL.> S11 SS 4,4,4,12 16 53

Golder Associates

RECORD OF BOREHOLE OW-49

PROJECT LOCATION: WOBURN

BORING DATE: 04/09/91

SHEET: 1 OF 2

DATUM: MSL

PROJECT NUMBER: 893-6255

SOIL PROFILE

BORING LOCATION: N:552,204.40 E:896,305.30

SAMPLES PENETRATION RESISTANCE

<u>۲</u>	¥		Т	Tg	T	_			T		1 2		LOWS/F		ю	PIEZOMETIE
DEPTH SCALI	BORING METHO	DESCRIPTION	SDSN	GRAPHIC LOG	DEPTH	NUMBER	TYPE	BLOWS / 8 in	N	REC/ATT	WA'	TER CON	ITENT, PI	ERCENT WI BO	io 1	OFI STANDPIPE INSTALLATIO
0		0.0-9.0 ft. V. dense, brown-pale brown c-f SAND, trace-some gravel, trace	T		64.20 0.00	S-1	SS	15,30,60	90	33	1					
		0.0-9.0 ft. V. dense, brown-pale brown c-f SAND, trace-some gravel, trace sift (SP). <fill></fill>				<u> </u>	-	10,00,00		-						
			SP								ĺ					
5						S-2	SS	13,26,45	71	67						
							_									
				\bigotimes	55.20 9.00											
10		9.0-64.0 ft. Compact-v. dense, gray-beige, c-I SAND, trace gravel, trace silt (SP). < OUTWASH SAND>		7.17	Į.				_							
		<outwash sand=""></outwash>		12.17		S-3	SS	2,5,6	11	67	•	ļ				
				23.17												
15				7, 17 7, 17 7, 14		S-4	98	3,4,11	15	100						
				13,14 13,14 13,14												
				12, 12 12, 13 13, 13	:											
20	8*x12" HSA													<u></u>		
	8*x18			12.27 12.27 12.27		S-5	SS	2,3,5	8	100	•					
				11.17 11.17 11.17												
	į															
25			SP	20, 22 20, 22 20, 23		S-6	SS	25,15,11	26	67] 			
							-	20,10111		<u> </u>						
30				15,47 15,47 15,47	ar.											
				10.14 10.14 10.14		5-7	ss	16,18,30	48	100			•			
				52.37 52.37 52.37												
				12.12.12												
35								4								
				77, 1.7 77, 1.7 77, 1.7		S-8	58	16,13,20	33	67						
				1,17 1,17 1,17												
40				\Box												

DRILL RIG: Brat 22R

DRILLING CONTRACTOR: D.L. Maher

DRILLER: JRM

Golder Associates

LOGGED: DSL CHECKED: RMG

DATE: 04/10/91

RECORD OF BOREHOLE OW-49

BORING DATE: 04/09/91

SHEET: 2 OF 2

DATUM: MSL

PROJECT LOCATION: WOBURN PROJECT NUMBER: 893-6255

BORING LOCATION: N:552,204.40 E:696,305.30

YFE	물	SOIL PROFILE	т	10	r	 		SAMPLES	i	1	ł	8	LOWS/F	SISTANCI	E 80	PIEZOMETE
DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	SOSA	GRAPHIC LOG	ELEV DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	WAT Wp 2	ER CON	TENT, PI	ERCENT	•	OR STANDPIPE INSTALLATIO
4		9.0-64.0 ft. Compact-v. dense, gray-beige, c-f SAND, trace gravel, trace silt (SP). <outwash sand=""></outwash>		11.11	24,20 40.00	S-9	ss	11,18,33	51	87				ļ		
		<pre><outwash sand=""></outwash></pre>												:		
45				11.12 12.12 12.12 12.12		S-10	SS	12,25,40	65	100						
- 50						S-11	SS	15,25,28	53	100						
	8'x12" HSA		SP													
55						S-12	\$6	15,26,30	56	100			•			
	-															
60				11.22 11.22 11.22		S-13	SS	9,12,19	31	100		•				
		64.0-66.5 ft. V. dense, olive		202	0.20 64.00		:									
65		green-gray m-f SAND and SILT, little gravel (SM). <glacial till=""></glacial>	SM	10,000,000	-2.50	5-14	58	37,100/.4	<100	67						
70		AUGER REFUSAL - BORING TERMINATED AT 86.5' BELOW GROUND SURFACE.			6 6.50											
													'			
75																
							1000									
80							_									

DRILLING CONTRACTOR: D.L. Maher

DRILLER: JRM

Golder Associates

CHECKED: PMG
DATE: 04/10/91

PROJECT LOCATION: WOBURN

RECORD OF BOREHOLE OW-50

BORING DATE: 04/04/91

SHEET: 1 OF 2

DATUM: MSL

PROJECT NUMBER: 893-6255 BORING LOCATION; N:552,001.10 E:696,357.80

DEPTH SCALE FEET	Į į														PIEZOMETER
	BORING METHOD	DESCRIPTION	SOSI	GRAPHIC LOG	ELEV DEPTH	NUMBER	TYPE	BLOWS / & in	Z	REC/ATT		ER CON	TENT, P	ERCENT	OR STANDPIPE INSTALLATION
- 0		0.0-12.5 ft. Compact, brown, c-f SAND, trace-little gravel trace silt (SP). <fill></fill>	1		66.80 0.00	S-1	SS	4,11,18	29	80					
- 5			SP			S-2	SS	25,11,25	36	67					
- 10						S-3	ss	27,30,35	65	100					
15		12.5-56.3 ft. Loose-dense, beige-brown to gray, c-f SAND, little gravel, trace sift (SP).			54.30 12.50	S-4	ss	4,8,8	16	67					
· 20	8'x12' HSA		:	######################################											
	97x					S-5	SS	3,5,9	14	67					
25			SP			5-6	ss	15,16,30	46	33			-		
30			5				The state of the s								
3						S-7	SS	3,3,6	9	67	•				
35	i					S-8	SS	8,11,18	29	100		•			
40							i i								

PROJECT LOCATION: WOBURN

RECORD OF BOREHOLE OW-50

BORING DATE: 04/04/91

SHEET: 2 OF 2

DATUM: MSL



PROJECT NUMBER: 893-6255 BORING LOCATION: N:562,001.10 E:696,367.80

<u> </u>	ç	SOIL PROFILE					SAMPLES					ENETR		PHE 204 HETER		
FEET	BORING METHOD	DESCRIPTION		Ĭ	ELEV DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	WAT	OR STAND				PIEZOMETER OR STANDPIPE INSTALLATION
40		12.5-56.3 ft. Loose-dense, beige-brown to gray, c-f SAND, little gravel, trace sift (SP), <outwash sand=""></outwash>		14, 2 4 14, 2 4 14, 2 4	26.80 40.00	S-9	SS	3,3,3	В	67	•					
45		COUTWASH SANUS		16.00 16.00		S-10	SS	9,15,22	37	67						
50			SP			S-11-	SS	7,10,14	24	100						
55																
~				0.0	10.50	S-12	5 S	3,7,15	22	67		•				
60	8'x12' HSA	56.3-76.5 ft. Compact-v. dense, olive green to gray, c-f SAND, trace-some silt, little gravel (SP-SM).		0,50,50,50,50,50,50,50,50,50,50,50,50,50	56.30	S-13	SS	13,14,20	34	100						
35			SP-SM	<u> </u>				N/S								
70				**************************************		S-14	98	4,4,9	13	67	•				15 15 16 16 16 16 16 16 16 16 16 16 16 16 16	
75		AUGER REFUSAL - BORING TERMINATED		0.0505050505050	-9.70 76.50	S-15	ss	3,15,55	70					•		
»		AT 76.5' BELOW GROUND SURFACE.														
JE JE JE JE JE JE JE JE JE JE JE JE JE J	. RIG:	Brat 22R								1			1,		GED: DS	
		CONTRACTOR: D.L. Maher						er Associa							CKED: R	

Golder Associates

DATE: 04/06/91

APPENDIX C

Monitoring Well Construction Diagrams

							LATION				
	B93-6255 РКОЈЕСТ										
GA INSP	DSLDRILLING METHOD	8"_	ID x 12"	OD H	5A		GROUND (ELEV.	74.6 ft.	WATER DEP	TH9.0 ft.
WEATHER _	CLOUDY DRILLING COMPANY_		D.L. M	AHER			COLLAR E	LEV.	76.17 H.	DATE/TIME	04-02-91/083
TEMP	45 F. DRILL RIG BR	AT 22R	0	RILLER _	JRM	l	STARTED	16	25/04-01-91	COMPLETED	1200/04-03-9
LOCATION	/ COORDINATES N: 553,983.4	E: 696	106.8						THE / DATE		THE / DATE
			MATE		INVEN						SUIDUE GUIDE
	NG 4 in, dia 10.5										
	PE SCH 40 PVC										
	FLUSH THREADED										
GROUT QUA	ANTITYO	CEI	NTRAUZERS	·	NONE 1	USED		FILTE	R PACK TYPE	#20 OTT	AWA SAND
GROUT TYP	N/A	DRI	LLING MUD	TYPE .		N/A		INST	ALLATION METHO	DGF	RAVITY
1											
<u> </u>											
DEPTH	SOIL/ROCK DESCRIPTION			WEI	LL SKE	TCH			INSTA	LLATION 1	NOTES
		El		2.00			ling end cop		1		
E	†u	E	_	1.50			5" steel cas	ingE	A cond heid	an in the	ougers during
t		 		1.20	Н	W	ith locking (cart	ingtollat	ge 111 (116)	e outcore
ţ.	ODOUND GUSSIOS	F		0.30		#4	!O Ottawa s reep hole	onat	installation		
0.00	GROUND SURFACE	<u>[</u>		₩ ₩		עס סי	,	_			y resulting
0.00	0.0-2.0 ft. Compact, brawn, c-f SAND, trace	El		₹		Ø 0 5	—concrete	F	in some co	ving betwee	n 7.0 and
E	sitt. (SP)	El		0 0 K		004		E	4.0 ft.		
!	<fill></fill>	<u></u>		V V V		A A A	bentonite	E			
ţ.	2.0-5.5 ft. Very loose,	t	2.50	7,7	l 🏻	P P P	pellets	ţ	Collar eleva	tion refers	to top of
F	white-orange purple SILT.	;	3.00	XXX	l 🏻	XX		F			
Ē	(CL)	F		1 XXX	l 83	$\times\!\!\times\!\!\times$		E	PVC riser.		
E		El	4.00	$\times\!\!\times\!\!\times$	🔯	ॐ	-bentonite s	seal[-
•		ł!		7. Y		ノコ		ŀ			
5.00		<u> </u>		125			- #20 Ottav				
ŧ	<fill></fill>	ţi .		[C]	1	्र	—#20 Ottav sand and		1		
-	5.5-10.0 ft. Loose, brown- orange, c-f SAND, trace	F		۱ / ۱		71	some cav				
Ē	sitt. (SP)	E		\mathbb{Z}]],		moterial	E			
E		E)	7.00	1				E			
ŗ		t i		} :	-		—4" sch 40	>			
ţ		t i		[:		1	PVC riser	. ‡			
F		<u> </u>	9.00] : :	F	4		F			
E		04/02/91	<u>=.</u> *_			1	12" boret	nole	L		
10.00	<fill></fill>	0830						E			
1	10.0-17.0 ft. Very dense,	t /		(1.4		. 1		ţ	<u> </u>		
Ē	olive-green grey, c-f SAND, trace silt, little-	E			+	::		F			
F	trace gravel. (SP)	El			-		—4" sch 40				
Ł		El			H=H		PVC 0.010 slotted scre		———		
ļ .		F l			+		alocted SCI	een [
Ī		Fi						ļ			
F		E	14.00]			—thraadad	È	MELL BE	VELOPIE	IT NOTEC
ļ		ŧ.				\neg	—threaded end plug	F	WELL DE	VELOPME	NT NOTES
15.00		1				[Ļ	<u> </u>		
ŧ		El			2.54		#55 5::	Ē	Well develop	ment stort	ed on
Ł)	El]		· •	—#20 Ottav sand	vo E	040591	and comple	ted on
ļ .	<glacial till=""></glacial>	<u></u>	17.00				จนกฉ	E	04-12-91.	The first	round of
ŧ .	AUGER REFUSAL-BORING	F		<u> </u>	7			ţ	development		
F	TERMINATED AT 17.0 FT.	E			/pc	ottom	of	F	centrifugal p		
E	BELOW GROUND SURFACE	E			t	boreh	ole	E			
ŧ		H						E	development		
.		FI .						ţ			polyethelene
20.00	<u> </u>	F						ļ			oed dry <u>durin</u>
E	[El						F	each develo	pment cycl	e
Ŀ		E						E	A total of	148.5 gallor	ns were
ł		<u> </u>						E	purged with	water rem	aining very
ţ	<u>}</u>	t]						E	turbid.		
ŧ		F)								otroctivity -	tabilized with
E		E						F			
t	1	t l						E			0 umho/cm
	1	<u> </u>						Ę	respectively		
25.00		[]						ļ.	<u> </u>		
Į.		[]						Į.	<u> </u>		

	PROJECT						<u> </u>
	MRS DRILLING METHOD						
	PARTLY CLOUDY DRILLING COMPANY_						
TEMP			JAG STAR	TED1600/()4-1191	COMPLETED 173	0/04-11-91
LOCATION	/ COORDINATES N: 553,902.3		*,,	THE	/ DATE		TIME / DATE
			INVENTORY				
WELL CASI	NG4 in. dia, <u>8.0</u>			I F RENTONIT	F SEAL EN	MROPLUG BENTO	ONITE CHIPS
	PE SCH 40 PVC						
	FLUSH THREADED						
	ANTITYNONE						
GROUT TYP	PE N/A	DRILLING MUD TYPE	N/A	INSTALLA	DON METHOD	- GKAVI	<u> </u>
DEPTH	SOIL/ROCK DESCRIPTION	WE	LL SKETCH	I	INSTALL	LATION NOT	rec
UEFIA	SOIL/ROCK DESCRIPTION		rexpanding end	L	INSTAL	LATION NOT	LJ
Ę		- 2.00 -	/6" steel	casina th-	 		
ļ		1.50 1.00	with locking	ig copt Co	<u>llar elevati</u>	on refers to	top of
F		<u> </u>	#20 Ottaw	a sand PV	C riser.		
<u> </u>	GROUND SURFACE	<u> </u>	weep hole	• FL			
0.00	0.0-0.3 ft. Soft brown	[] \ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	cement				
•	SILT, some c-f sand,	[May a	 			
Ī	mass. (ML)	± 15 ft 150 €	R i ₹	F			
, [04-11-91 1140		<u>[</u>			
Ė	0.3-1.3 ft. Firm, red- purple SILT, some f-sand,	El ! XX	bento				
	little c-f gravel. (ML)	- 3.00 ⊗0		" ⊧—			
Ĺ	<fill></fill>			FI			
İ		4.50	4" sch				
5.00	1.3-9.8 ft. Loose to		PVC I				
ţ	compact, c-f, light brown			<u> </u>			
<u>;</u>	SAND, trace silt. (SP)	;	- 10" bo	rehole			
<u> </u>	1	6.50		E			
	1	[]		[
-			4" scr	40			
		<u> </u>	PVC 0	.010"			
]	slotted	screen -			
	<outwash sand=""></outwash>			<u>:</u>			
10.00	30013001 00000						
	9.8-17.0 ft. Very dense,	[E 			
	olive grey, c-f SAND and			:			
	c-f GRAVEL, trace silt. (SP)	[]	#20 Ott				
			sand	i EL			
	1			E			
		<u> </u>		<u> </u>			
-		‡l ∤ w.d		FI V	WELL DEV	ELOPMENT	NOTES
15.00				<u> </u>	·		110,20
. 13.00]		175	al wae	daystaned on	
r			 			developed on	
• •		16.50				nd 80 gallons	
	<galcial till=""></galcial>	17.00 لرك	caved	L		g a Wattera	
-	AUGER REFUSAL-BORING	1	materio			uctivilty stabi	
	TERMINATED AT 17.0 FT BELOW GROUND SURFACE	: \	─threaded end plug	val	ues of 5.3	8 and 1840 i	umho/cm
	BELOW GROOMS SOM ACL	: \	bottom of	res	spectively.		
	ĺ		borehole			mained very t	lurbid.
20.00		:		:[•	
_ 40.00		-		<u> </u>			P**T
•	ļ	:		EI—			
	1			EH			w-
•				⊧ —			
-	ļ	-		-			
				├			
•		:		EL			
-		-		E	4		
25.00							
25.00	i I	-		<u>-</u> -			
				⊧ }—			
-	 	-		 - -			
•	 	-		FL			
		:		EI .			

	893-6255 PROJECT 18						
							69.4 ft WATER DEPTH
WEATHER _	CLOUDY DRILLING COMPANY_	D.L. MAI	4ER			COLLAR ELEV.	70.84 ft. DATE/TIME 04-10-91/1100
Т <u>Е</u> МР	55 F. DRILL RIG MOBIL	LE B-53 ATV DRI	LLER _	JĄ	.G	STARTED13	350/04-10-91 COMPLETED 0900/04-11-91 TIME / DATE
LOCATION ,	/ COORDINATES N: 553,581.5	E: 696,162.5					TIME / DATE TIME / DATE
		MATER	ĪALS	INVE	ENT	ORY	1/4" BENTONITE PELLETS
WELL CASIN	16	I.f. WELL SCREEN		In.	dio	I.f. IfEN	TONITE SEAL 1/4" BENTONITE PELLETS
CASING TYP	201 40 FVC	SCREEN TYPE _		_Stn -	40 F	VC HIST	TALLATION METHOD GRAVITY
							ER PACK OTY. 550 LBS.
							ER PACK TYPE #20 OTTAWA SAND
GROUT TYP	EN/A	DRILLING MUD	TYPE .		<u>N//</u>	inst	FALLATION METHOD GRAVITY
DEPTH	SOIL/ROCK DESCRIPTION		WF	LL SK	FTCI	1	INSTALLATION NOTES
DC7	SOIL/NOON PESSON NON	<u></u>				nding end cop	manner non notice
ţ			2.00 1.50			-6" steel casing	
Ė			1.00			with locking cap	The state of the s
į .		£			1	#20 Ottawa sand -weep hole	surface, bentonite pellets were
	GROUND SURFACE 0.0-0.6 ft. Firm. dark	<u> </u>	₩	*	╉┯		used in lieu of liquid grout.
0.00	brown SILT and SAND,	{	. Iv8	1	∦પ્ર	cement	1.5 ft. water level necessitated use
ļ.	little c-f grovel, root	1.50 R1.50	₹ ₹	1	∜⊻	<u> </u>	of pellets to 1.5 ft. below ground
į.	mass.	04-10-91	XX	1	W	i E	surface, cemented from that point
Ė	0.6-3.9 ft. Construction	1100	XX	1 1	3	bentonite	to surface.
į	waste including concrete and brick.	3.00	- XX -	1	XX	seal	
ļ.	drid briek.	_ 4.00	\otimes	1	XX	į	· · · · · · · · · · · · · · · · · · ·
ŧ	3.9-7.2 ft. Compacted,					4" sch 40	Collar elevation refers to top of
5.00	brown, c-f SAND, some c-f gravel, little silt.	£] [PVC riser	PVC riser.
Ė	(SP-SM)	E]		i E	
Ė		<u>E</u>				, <u> </u>	
ŧ	<outwash sand=""></outwash>	7,00	42.7	1 _	.:	10" borehole	:
E	1001101101101	[1				
;		£				, ‡	
Ė		<u> </u>	ļ	-		. <u>E</u>	
Ę.		E]		 		4" sch 40	
10.00		F	:			PVC 0.010" slotted screen	
Ē	7.2-20.5 ft. Very dense, c-f, multi-compositional	<i>E</i> l				slotted screen	
Ė	GRAVEL, and c-f, olive	<u>F</u>		\vdash		ı E	
F	grey SAND, troce silt. (GP)	El	T^{-1}	\vdash		: 	
		F	1			E	
		£	1			; þ	
		F	1: ::	\vdash	-	#20 Ottawa	
		E	1			sand F	WELL DEVELOPMENT NOTES
15.00		<u>E</u> l				; <u> </u>	
		E	::	<u> </u>		Ė	Well developed on 04-16-91 and
Ė		E	· · 3	$\vdash = \vdash$		E	130 galons of water were removed
		17.00	1	$\vdash \vdash$		<u>.</u> ‡	using a Wattera foot valve.
Ė		<u> </u>	1	<u> </u>	•	threaded -	PH and canductivity stabilized with
[A			- 1	ļ	values of 7.14 and 1800 umho/cm
•		řl			j	. E	respectively.
[19.50_					
20.00		- - 13.22.	77	777	77	end of re-bore	
Ē	<glacial till=""></glacial>		<u> </u>	<u>,,,,</u>	75	—caved material	
	AUGER REFUSAL-BORING	ř		- ₹.	otto	<u> </u>	
	TERMINATED AT 20.5 FT. BELOW GROUND SURFACE	دَا			bore	L	
	DEED'H ONOOND DESTRICE	Ĥ				‡	
[Ē				E	
		Ā				‡	
!		Ē				E	
25.00		ξ				ţ	
F 20		-				F	
F	ŀ	ēl .				E	
ļ j		ŕ				<u> </u>	
		ř.				-	

								LATIC				
		893-6255 PROJECT										
		DSL DRILLING METHOD										
	WEATHER_	OVERCAST DRILLING COMPANY_		D.L. MA	HER			COLLAR	ELEV.	67.88_ft.	DATE/TIME	03-27-91/0650
	TEMP	40 F. ORILL RIG BRAT	22R	DI	RILLER .	JRI	М	STARTE	D!	510/03-26-91	COMPLETED	1630/03-28-91
	LOCATION	/ COORDINATES N: 553,059.9	<u> </u>			•——				TAME / DATE		
	WELL CASH	NG <u>4</u> in. dio. <u>8.1</u>		MATEF					I.f. BEN	TONITE SEAL E	NVIROPLUG B	ENTONITE CHIPS
	CASING TY	PE SCH 40 PVC	SCR	EEN TYPE.		SCH 4	10 PV	С	INST	ALLATION METHO	D GR	YTIVA
		FLUSH THREADED										
		ANTITY NONE USED										
		E N/A										
	DEPTH	SOIL/ROCK DESCRIPTION			WE	LL SKE	TCH			INSTA	LLATION N	NOTES
	-		ţ]									
			E			∽6 "	steel 1	flush mour	nted	Difficuity in:	stalling the	well due to
			<u> </u>					COVER	· · · ·	high turbidi	ty of water	
		GROUND SURFACE	<u> </u>				xpond	ling end c	ор	The well ha	d to be hel	id down in
	0.00	0.0-2.5 ft. Very dense,	tl -	Q.7U	₹v		V V-4	—concret	e þ	place while	the sand p	ack was
		c-f SAND, little gravel, trace silt. (SP)	[] -	1.00] [_	#20 Ot		being added	1.	
		, ,	-	1,30	XXX	d b	XXX	sand	F			
		<fill></fill>	[XXX	\$	**	—bentonit seal	e [
		25 75 8 0	-	3.00	XXX		XXX	3601	F	Collar eleva	tion refers	to top of
		2.5+7.5 ft. Compact, pale brown-grey, c-f SAND,	E		::	1 /	·			PVC riser.		
		troce sit. (SP)	<u> </u>			1 1	1 	-#20 Ot	1			
	5.00		- 3 4.8 ft. 03-27-91]		Sand		·		
	<u> </u>		0650						F			
	-		E		ĺ.,		•	4" sch PVC ris				
			ŧl			1		FVC	ser			
	<u>.</u>	<fill></fill>	}			} }	·		Ę			
		7.5-10.5 ft. Compact, dark		8.50	- "	1		- 12 [™] bor	ehole	<u> </u>		
	-	purple, f-m SAND and	-	6.50					þ			
		SILT. (SM)	[!				E			
	10.00	at it is			}				 			
		<fill> 10.5-12.5 ft. Compact,</fill>							F			
	-	grey, f-m SAND and						4" sch PVC 0.0				
	-	SILT. (SM)	-					slotted si				
		<pre>CFINE GRAINED GLACIAL TILL> 12.5+14.5 ft. Very dense,</pre>	=		P 1.				E			
1	-	olive green~grey, f~m	:	13.50)	, ¦	<u> </u>		
		SAND, some grovel, little		14.00				threade end plu	a t	WELL DE	VELODAEN	IT NOTES
	15.00	sit. (SP) <glacial till=""></glacial>	-	14.50	\bowtie	$\times\!\!\times\!\!\times$	$\propto \sim$	bentonite	seai	WELL DE	VELOPMEN	NOTES
İ	15.00	AUGER REFUSAL-BORING TERMINATED AT 14.5 FT.	1		1	botto	om.		F	Well develop		tarted as
Ì	-	BELOW GROUND SURFACE	-			of bore			Ė	04-05-91 d		
	-		-						F			
									E	04-12-91.		Wattera foot
	-		:						-			pumped dry
			-						-	with each c		pariiped or y
	-		E						F	PH and con		abilized with
l	20.00								- [values of 7.		
į			-						ŀ	respectively.		
	-		:						F	The water r		oudy.
									E			
ı			:						F			
			:						Ė		•	
ļ	<u> </u>		:						Ę			·
	-								E			
	25.00								F			
			-:									

	893-6255 PROJECT							
	MRS DRILLING METHOD							
	DRILLING COMPANY_							
	DRILL RIG BRAT			JRM	STARTEDO	B40/03-19-91 TIME / DATE	COMPLETED	28−9 π
LOCATION	/ COORDINATES N: 552,754.2							
				INVENTO			/4" DENTONITE DELL	
	NG <u>4</u> in. dia. <u>13</u>							:15
CASING TY	PE SCH 40 PVC	SCREEN	TYPE	SCH 40 PVC	INST	ALLATION METHO	GRAVITY	
	FLUSH THREADED							
	ANTITY 155 GALLONS							<u> </u>
GROUT TY	PE VOLCLAY	DRILLING	MUD TYPE _	N/A	INST	ALLATION METHO	GRAVITY	
DEP TH	SOIL/ROCK DESCRIPTION	<u> </u>	WF!	L SKETCH		INSTAL	LATION NOTES	
-		-1	2.00		ing end cap			
Ę		El	1.50	7 6	" steel casing F		grout at approxima	-talv
F		F	1,35	#2	ith locking cap		w ground surface.	ICEIY
	GROUND SURFACE	E.	0.40	X v	reep hole	B.O II. Beid	w ground surface.	
0.00	0.0-0.6 ft. Loose, brown,		100 P	X v v	—bentonite	55 antions	of water were used	to.
Ė	c-f SAND, some silt,	E	\rangle \sqrt{4}		seal	flush tiole.	OI MOTEL MELE DECO	
-	some 1-gravel, root moss. (SM)	<u> </u>	1.60			nuan noie.		
:	0.6-1.4 ft. Dense, grey,	E!			—portland	No water "	sed in drilling.	
-	C-f GRAVEL, some c-f	t	2.00 A A	\[\frac{\lambda}{\rangle}\rangle	cement [וייט איטנפו ע	oca in arming.	
	sand, trace silt, cobbles present. (GP)	[7///	777	E	Calles eleval	tion refers to top of	
-	1.4-2.5 ft. Purple, c-f	[]			-volclay grout	PVC riser.	tion releas to top of	
5.00	SAND, some silt. (SM)				E			
3.00	5.0-9.0 ft. Stiff, white	t			→12" borehole	 		
	CLAY. (CH)	ŧI .			E	: 		
-		j -			ļ			
	}	F) —	7.∞		E			
					— bentonite seal			
		E			E			
-	<fill></fill>	F	🟻		Ė		•	
10.00	9.0-14.0 ft. Compact,	9.5 ft. 03-19-91 0855	9.50	-XXX	4" sch 40			
	olive grey, m-f SAND, little block silt, abundant	0855	.: . ;		PVC riser		***	
-	muscovite flakes. (SP-SM)	;			ļ		•	
		[11.50		E			
		F [_	—#20 Ottowa			
		E			sand			
•	<outwash sand=""></outwash>	ŧ!			ļ			
					4" sch 40 F PVC 0.010"	WELL DE	VELOPMENT NOTE	S
15.00	14.0-18.0 ft. Very dense, orange to olive grey, c-1			\equiv	slotted screen			
	SAND and GRAVEL, trace	[]			ţ	The well wo	s developed on	
-	silt. (SP)	ΕΙ.	16.50		[04/16/91 0	ind 130 gallons were	?
	}				—threaded — end plug	removed us	ing a Wattera foot	
_	401 4 0141 THE	н —	7.40		· •	valve and p	olyethelene tubing.	
	<glacial till=""></glacial>	[]	8.00 [-[-[<u>. , , , , , , , , , , , , , , , , , , ,</u>	—caved — material	PH and cor	ductivity stabilized v	with
<u>.</u>	AUGER REFUSAL-BORING TERMINATED AT 18.0 FT.	<u> </u>		bottom	-		.14 and 1800 umho/	/cm
	BELOW GROUND SURFACE	El		of boreho	ole [respectively	•	
20.00		 			<u> </u>			
:		<u> </u>			E			
<u>.</u>		<u> </u>			þ	<u></u>		
		[]			Ę	<u> </u>		
•		-			Ę			
					E			
<u>.</u>		-			E			
		E			Ė	L		
25.00		<u> </u>			E	<u></u>		
Ĺ]			ļ			
ļ.					E			
<u> </u>		t)			ļ	L		

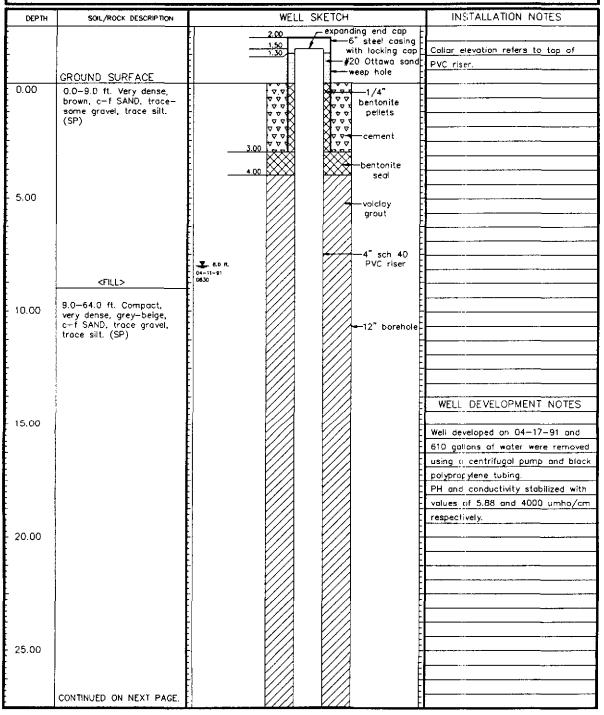
JOB NO.	893-6255 PROJECT	NDUSTRI-PLEX/WOBURN/	MASS	WELL NO	OW-48	SHEET 1 of 3
GA INSP	MRS DRILLING METHOD _	8" ID x 12" OD HS	Α	GROUND ELEV.	63.0 ft	WATER DEPTH 6.5 ft.
	PARTLY CLOUDY DRILLING COMPANY					
	45-50 F. DRILL RIG BF					
LOCATION	/ COORDINATES N: 552,337.6	F: 696.264.5		STARTED JAMES	TWE / DATI	TME / DATE
LUCKTION	/ COORDINATES	MATERIALS	INIVENITORY			
					FN	VIROPLUG BENTONITE CHIPS
WELL CASI	NG4 in. dia36.0	I.f. WELL SCREEN	in, dio	1.1. BENT	ONITE SEAL	CRAMIN
	PE SCH 40 PVC					
	FLUSH THREADED					
	ANTITY 185 GALLONS					
GROUT TYP	EVOLCLAY	DRILLING MUD TYPE	N/A	*NSTA	ALLATION METHOD	GRAVITY
	1	1	01/57011	***	NOTAL	LATION MOTEO
DEPTH	SOIL/ROCK DESCRIPTION	WEL	L SKETCH	· · · · · · · · · · · · · · · · · · ·	INSTAL	LATION NOTES
ŧ	1	2.00	_expanding e			
E	į.	1.50	with lo	eer casing F ocking cap [Collar elevat	ion refers to tap of
t		0.50	#20 Ot	tawa sand‡	PVC_riser.	
ļ.	GROUND SURFACE	F	Mweep	hole †		
0.00	0.0-0.4 ft. Compact,	0.60	X 	entonite -		····
.	brown, c-f SAND and		D D D	seal [· · · · · · · · · · · · · · · · · · ·	
F	GRAVEL. (SP-SM)		₽₽₽	Ħ		
E	(FILL)			oncrete [
ļ.	0.4-4.5 ft. Cobbles and	3.00	\[\bu \cdot \bu	FI		
ţ.	boulders.			ţ.		
Ē			///	H	<u> </u>	
ŀ	<fitt></fitt>			olclay Frout		
5.00			//// °			
Ē	4.5-26.5 ft. Loose, brown-black, c-f SAND,		<i>Y//</i> 3	E!		
E	little c-f grovel, little silt,		(//)	<u> </u>		
ţ	organics, wood, hides and	€ 6.5 ft. 03-21-91	V//1	ţ.		
	burlap present. (SP-SM)	0900		ţ		
				-		
:	;		- V///	[
Ŧ.				sch 40 F VC riser		,
			- <i>V//</i> // '	*C 11361 [
10.00				F	*****	
-				El		
		FI 1///		F		
			12	" borehole		
E			Y///	H		
1				E		
ţ.	1			Ħ		
Ē		[<i>Y//</i> /	‡I	WELL DE	VELOPMENT NOTES
15.00			1//2	£		
Ē			V//A	ļ		ment was started on
<u> </u>				E		and completed on
-			1//	ţ	04-05-91 c	sing a centrifugal
E			1///	F	pump.	
ļ			Y ///	FI	A total of S	125 gallons were purged.
			(//)	ļ.	PH and con	ductivity stabilized with
			1///	F	values of 5.	6 and 990 umho/cm
				Ę	respectively.	· · · · · ·
20.00			1//	Ħ	, ,	
[1///	F		
-			1///	H		
t i			1//2	ţ !		
<u> </u>				H		
:			<i>Y//</i> /	E		
	[1///	H		
[}		
25.00			<i>Y//</i>	E		···
t = 1		• 1///	V//	<u> </u>		
[PER LA		<i>Y//</i> /	‡]		
<u> </u>	<fill></fill>		1//	ET		
	CONTINUED ON NEXT PAGE.		V//	E l		

	893-6255 PROJECT 1						
GA INSP	MRS DRILLING METHOD PARTLY CLOUDY DRILLING COMPANY	DI M	AHFR		GROUND ELEV.	64.72 ft	WATER DEPTH
WLATHER .	45-50 F. DRILL RIG BR	AT 22R	5111515 5111515	PM	COLLAR ELEV.	945 /03-22-91	.DATE/TIME 0930/03-27-91
	/ COORDINATES N: 552,337.6		KILLER	NIP)	SIAKIED	TIME / DATE	TIME / DATE
LOCATION	COUNDANTES		RIALS INV	ENTO	RY		
WELL CASE	NG <u>4</u> in. dia. <u>36.0</u>					TONITE SEAL EN	AROPLUG BENTONITE CHIPS
CASING TY	PE SCH 40 PVC	SCREEN TYPE	SCH	40 PV	C INST	ALLATION METHOD	GRAVITY
	FLUSH THREADED						
	ANTITY 185 GALLONS						
	E VOLCLAY						
							1.7.0.1.1.0.TEQ
DEPTH	SOIL/ROCK DESCRIPTION		WELL SH	ETCH	<u> </u>	INSTAL	ATION NOTES
	26.5-52.5 ft. Loose-dense,	<u> </u>			l		
	c-f SAND, trace f-gravel, trace silt. (SP)	 		1//	volciay grout	Collar elevati	on refers to top of
	trace site (ar)	El		V//	1 l	PVC riser.	
30.0		30.00			<u> </u>	-	
55.5		Ē			bentonite seal		
		-		\otimes	{ [·	
		E			4" sch 40	 	
		32.50	KXXX	XXX	PVC riser	<u>-</u>	
		<u>[</u>			1		
		-		-	#20 Ottawa	<u> </u>	
		34.50	┦]	sond		
35.00				ļ · .	1	<u>-</u>	
		[<u> </u>	
					4" sch 40		
]	PVC 0.010"		
					slotted screen		
		- <u> </u> - <u> </u>				:	
]]		
		Ė	 -	-	j	<u> </u>	
40.00			l _	1		-	
					i	i	
		-					
					-12" borehole	·	
		-		1	i ‡	·	
	']	<u> </u>	
					1 - 1	WELL DEV	ELOPMENT NOTES
4E 00		44.50		<u> </u>	threaded		
45.00				·	end plug	Well develops	ment was started on
		46.00	KXXXXXX	XXXX		04-04-91 a	nd completed on
			*******	XXX	bentonite	04-0591 u	sing a centrifugal
		-1	 	888	seo)	pump.	
		48.00		\times		A total of 9:	25 gallons were purged.
		<u>:</u> }	┡╴ ┍ ╸╤╸╤╸	┍┪┸┸┸	[PH and cond	luctivity stabilized with
		<u>:</u>		ᅜᅷᅷ	{	values of 5.6	and 990 umho/cm
50.00	ļ			<mark>┝┸┸┸╋</mark>	caved	respectively.	
					material		
			<mark>;,,,,,,,,,,,</mark> ,,,,,,,,,,,,,,,,,,,,,,,,,	┍┪┎┩┎┙	. I		
				֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	∮		
	<outwash sand=""></outwash>	<u>-</u>		֓֡֓֓֓֓֓֡֓֓֡֓֓֓֡֡֡֡֓֓֓֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡֡	j E	<u> </u>	
	52.5-66.25 ft. Dense-very		╟┸┸┸┸┸ ╻		ļ ‡		
	dense, olive grey SAND, some gravel, trace silt.	-	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	أحرك	∤		
	(SP)		<mark>┍╌┰┰┰┰╻╸</mark>	7,7,7	†		
55.00			<mark>┢╸╶╸╶╸╸╸</mark>	, i, i,]		
				~]		
		[<mark>┢╸</mark> ╌╸╌╸	┍ ┸ ┸	Į Ē		
		-			}		
	CONTINUED ON NEXT PAGE.	[لہ کے لیے کہ سا		ļ ‡		

		ITORING WELL INSTAL		
JOB NO	893-6255 PROJECT	NDUSTRI-PLEX/WOBURN/MASS	WELL NOOW-48	SHEET 3 _ of 3
		8" ID x 12" OD HSA		
		D.L. MAHER		
		AT 22R DRILLER JRM	STARTED0845/03-22-91 THE / DATE	COMPLETED 0930/03-27+9
	/ COORDINATES N: 552,337.6	MATERIALS INVENTOR	RY	
WELL CASH	NG4in. dia36.0	I.f. WELL SCREEN4 in, dia	.10 I.f. BENTONITE SEAL .5	ENVIROPLUG BENTONITE CHIP
		SCREEN TYPE SCH 40 PVC		
		SLOT SIZE 0.010" MACHINE S		
		CENTRALIZERS NONE USED		
GROUT TYP	VOLCLAY VOLCLAY	ORILLING MUD TYPEN/A		ODGRAVITY
DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTA	ALLATION NOTES
- 60.00	52.5-66.25 ft. Dense-very dense, olive grey SAND, some gravel, trace silt. (SP)		—caved Coliar slevi material PVC riser. ←12" borehole	ation refers to top of
65.00	<pre><glacial till=""> AUGER REFUSAL—BORING TERMINATED AT 66.25 FT. BELOW GROUND SURFACE</glacial></pre>	65.75 bottom of borehole	-bentonite seai	
70.00				
- 75.00			Well develor 04-04-91	every property was started on and completed on using a centrifugal
- B0.00			A total of PH and co	925 gallons were purged inductivity stabilized with 5.6 and 990 umho/cm y.
- 8 5.00		•		

	893-6255 PROJECT 1						SHEET1
	DSL DRILLING METHOD						
WEATHER .	FAIR DRILLING COMPANY	D.L. MA	HER		COLLAR ELEV.	64.39 It.	OATE/TIMED3-26-91/0830
TEMP.	35-40 F. DRILL RIG BR	AT 22R DE	IILLER	JRM	STARTED1	505/03-25-31 TIME / DATE	COMPLETED 1000/03-26-91 TME / DATE
LOCATION	/ COORDINATES N: 552,334.9		NALC S	ALL /ENIT/O			
	IG 4 in. dia, 16			NVENTO		EN	MROPLUG BENTONITE CHIPS
	PE SCH 40 PVC						
	FLUSH THREADED						
	ANTITY 100 GALLONS						
GROUT TYP	E VOLCLAY	DRILLING MUD	TYPE	N/A	INS:	TALLATION METHO	D GRAVITY
 			SAICT A	CHETCH		INICTAL	LLATION MOTEC
DEPTH	SOIL/ROCK DESCRIPTION			SKETCH	ting and ann	INSTAL	LLATION NOTES
Ē.		-	1.50		ling end cap 5" steel casing	<u>-</u>	well to OW-48 hole not
ŧ	Į.		1.30				well to UW-48 hole not
ŧ	ADA: 410 - 514554 A5		0.40		20 Ottawa sand weep hole	sampled.	
0.00	GROUND SURFACE		<u>~~</u>	Q vv	1/4"		
0.00	FOR SOIL DESCRIPTIONS	1.00	~~√		bentonite	-	tion refers to top of
-	SEE LOG OW-48.	H	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	▼ ▼	—concrete	PVC riser.	
		2.00 2.25		XX	1/4"	<u> </u>	
-		3.00			bentonite pellets		
					penera		
		E				-	
5.00					volclay grout		
-					"		
Ę		[
		₹ 7.0 R.			12" borehole		
-		03-26-91 0630			12 Borenole	-	
						<u> </u>	
					-4" sch 40	<u>-</u>	
45.00					PVC riser	-	
10.00]		
Ė		11.00					
		<u>;</u>			—bentonite	-	
		12.50	XXX		seo!	-	
			100				
-		14.50				WELL DE	VELOPMENT NOTES
15.00			E	=	—4" sch 40		
			<u> </u>		PVC 0.010"	-	ed on 04-04-91 and
			Ξ		slotted screen		of water were removed
-		-					trifugal pump and black
-		5	 	=		- polypropylen	overed instantly.
			Ξ	\equiv			ductivity stabilized with
-		:		= "	#20 Ottawa sand		33 and 1800 umho/cm
20.00		[<u> </u>	=	30,70	respectively.	
	•					-	
_				=			
			-				
-				=			
E			 			<u> </u>	
ļ		<u> </u>		= ****	ļ	-	
		24.50			—threaded	<u> </u>	
25.00			Pagg.		end plug		
<u> </u>		26.00			ļ	<u></u>	
-	BORING TERMINATED AT			\		<u> </u>	
<u> </u>	26.0 FT. BELOW GROUND SURFACE	[bottom of boreh			<u></u>
ı		F I				- 1	

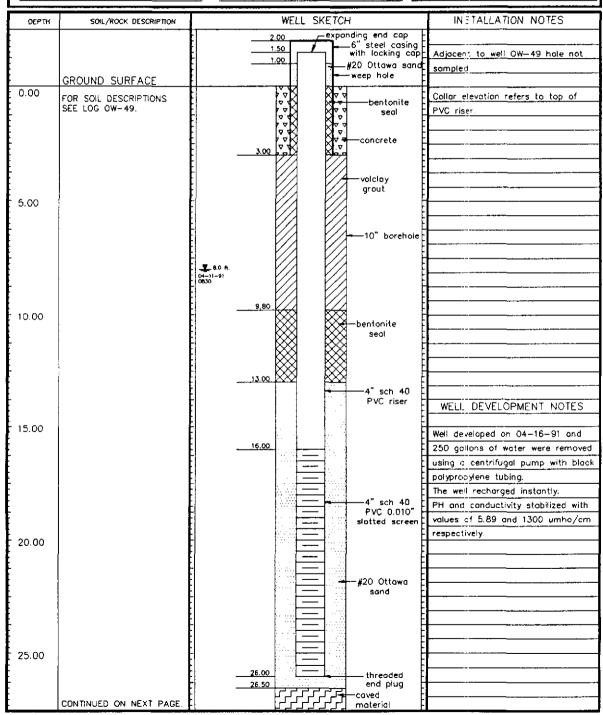
JOB NO. 893~6255	PROJECT	INDUSTRI-PLEX/WOBURN	/MASS	. WELL NO.	O₩-49	_ SHEET1	of	3
GA INSP. DSL	DRILLING METHOD _	8" ID x 12" OD H	\$A	_GROUND ELE	v. <u>64.2 °.</u>	_ WATER DEP	th <u>8.</u>	0 ft.
WEATHER FAIR	DRILLING COMPANY.	D.L. MAHER		COLLAR ELE	, <u>66.06 ft</u>	_DATE/TIME	04-11-9	1/0830
		RAT 22R ORILLER -		_STARTED	0830/04-11-91 TIME / DATE	_ COMPLETED	1430/04 fwe /	-11-91 DATE
WELL CASING4	in. dia47.5	MATERIALS	INVENTORY		INTONITE SEAL EN	WROPLUG B	ENTONITE	E CHIPS
		SCREEN TYPE						
		SLOT SIZE0.01						
GROUT QUANTITY	250 GALLONS	CENTRALIZERS	NONE USED	F11	TER PACK TYPE .	#20 OTT	AWA SA	ND
		DRILLING MUD TYPE						



	DSL PROJECT			64.2 ** WATER DEPTH 8.0 ft.
				66.06 ft. DATE/TIME 04-11-91/0830
TEMP	DRILL RIG BK	AT 22K DRILLER	JRMSTARTED	0830/04-11-91 COMPLETED 1430/04-11-91 TIME / DATE
LOCATION	/ COORDINATESN: 552,204.4	E: 696,305.3		
1		MATERIALS IN		
WELL CASI	NG <u>4</u> in. dia. <u>47.5</u>	I.I. WELL SCREEN 4	in. dia10 I.f. BEI	NTONITE SEAL ENVIROPLUG BENTONITE CHIPS
CASING TY	PE SCH 40 PVC	SCREEN TYPE SCI	H 40 PVC INS	TALLATION METHODGRAVITY
IOINT TYPE	FLUSH THREADED	51.07.5175 0.010"	MACHINE SLOTTED	TER PACK OTY. 550 LBS.
				TER PACK TYPE #20 OTTAWA SAND
GROUT TYP	PEVOLCLAY	DRILLING MUD TYPE	N/A INS	TALLATION METHODGRAVITY
L		- -		***
			COSTOLI	DISTALLATION MOTES
DEPTH	SOIL/ROCK DESCRIPTION	WELL :	SKETCH	INSTALLATION NOTES
ŧ			V//\	F
F	9.0-64.0 ft. Compact,		1///	Collar elevation refers to tap of
E	very dense, grey-beige, c-f SAND, trace gravel,		V//\d	PVC riser.
Ŀ	trace silt. (SP)		Y/// 10" 1 1 1 1 1	_
30.00	1		-12" borehole	<u> </u>
ţ.		:	<i>Y//</i> /	<u> </u>
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E			V/// •	E
Ŀ		·	voicloy	<u>-</u>
ţ.	1	: [///]	grout	[
ļ.		[//]	(//)	
F	İ	1 1//1	V//	
E			4" sch 40 PVC riser	[
35.00	İ		///	<u> </u>
ļ.			1///	<u> </u>
F			1///	F
E			V//A	E
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ţ		: [//]	1///	<u> </u>
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F				FI
E	j		Y///	<u> </u>
40.00			1///	F
Ē			V//\d	F
t			1///	<u> </u>
ŧ		42.00	(///	[
F			bentanite	F
E			seal seal	[
<u>t</u>		44.00	₩	<u> </u>
F	į		#20 Ottawa	WELL DEVELOPMENT NOTES
45.00			sand	
ļ		:	ļ.	Well developed on 04-17-91 and
E		46.00		610 gallons of water were removed
ļ.			- 	using a centrifugal pump and black
F			-	polypropylene tubing.
E				PH and conductivity stabilized with
ŧ .			<u>-</u>]	values of 5.88 and 4000 umho/cm
F			- - 4" sch 40	respect vely.
E			PVC 0.010"	(vispeet voly.
50.00		·	slotted screen	
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55.00			<u>-</u> [[]	
-	(<u> </u>	\$5.00	threaded	
F			end plug	
ţ l	CONTINUED ON NEXT PAGE.	57.00		
<u> </u>	SOM THINGED ON NEXT PAGE.		bentonite seal	-[

JOB NO	893-6255		IDUSTRI-PLEX/WOBURN	/MASS			OW-49	SHEET	3 of 3
GA INSP	DSL	DRILLING METHOD	8" ID x 12" OD H	SA	CROUND E	ELEV.	64.2 fl.	WATER DEP	THB.O ft.
WEATHER _	FAIR	DRILLING COMPANY	D.L. MAHER		COLLAR E	ELEV	66.06 ft.	DATE/TIME	04-11-91/0830
TEMP	50-60 F.	DRILL RIGBRA	AT 22R DRILLER _	JRM	STARTED	08	130/04-11-91 THE / DATE	_ COMPLETED	1430/04-11-91 THAE / DATE
LOCATION ,	/ COORDINATE	N: 552,204.4					THE / DAIL		1991 , VO. L
WFIL CASI	NG 4	in dia47.5	MATERIALS			RENT	DANTE SEAL EL	NVIROPLUG E	BENTONITE CHIPS
CASING TY	PE	SCH 40 PVC	SCREEN TYPE	SCH 40 PVC		INST/	NLATION METHO	n GF	RAVITY
JOINT TYPE	- — <u> </u>	LUSH THREADED	SLOT SIZEO.O'	10" MACHINE	SLOTTED	FILTE	P PACK OTY	550	LBS.
			CENTRAUZERS						
			DRILLING MUD TYPE						
							LLEA THE		
DEPTH	SOIL	/ROCK DESCRIPTION	WF	LL SKETCH			INSTAI	LLATION N	VOTES
	+	/ROOK DESCRIPTION	J XXX	XXXXXXXXX		 			10.25
•	9.0-64.0	0 ft. Compact,		XXXXXX)	-bentonite	E)		· · · · · ·	
-	very den	nse, grey-beige,	<u>59.00 XXX</u>	XXXXX	seal	H	Collar elevat	ion refers	to top or
	trace sil	ND, trace gravel, It. (SP)				į.	PVC riser.		
60.00		· (3.7	┦╌╌	Ţ <mark>ŢŢŢŢŢŢŢŢŢ</mark>		H	<u></u>		
		į	1	┍ ┸┸┸┸┸	→-12" boreh	role -			
-		F	┆			H			
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		E		┍┪┍┦┍┤┎┦ ╒ ╅	— caved	Ħ			
	_{<qut< sub=""></qut<>}	WASH SAND>	┆		material	1			
	64.0~66	5.5 ft. Very dense,	│ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃ ┃			Ħ			
65.00		en-grey, m~f		┸┸┸┸		Ħ			
VV	gravel. (nd SiLT, little (SM)		;-;-;-;-;-;		FI.			
		<ΠLL>	56.00	******	—bentonite	E			
	F	FUSAL-BORING		xxxxxx	seal	ļ:[
		ED AT 66.5 FT.		bottom	1	Ħ			
	BELOW GR	ROUND SURFACE		of boreho	ole	E			<u> </u>
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1		E]			ET			
30.00		ļ.				14			
70.00		E				E			
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75.00	1	F				1	··· develop	04-	-7 01 and
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		E				H			vere removed
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		ŧ				F)			abilized with
}		Į.				1			00 umho/cm
		Ē				Eŀ	respectively.		
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JOB NO. 893-6255 PA	ROJECTINDUSTRI-	PLEX/WOBURN/MA	155 WELL NO.	OW-49A	SHEET 1 of 2
GA INSP. MRS DE	RILLING METHOD6-	5/8" 10 × 10" 00	HSA CROUND 8	ELEV. 65.2 ft	WATER DEPTH 8.0 ft.
WEATHER CLEAR, WINDY DE	RILLING COMPANY	D.L. MAHER	COLLAR E	LEV. 66.42 ft.	DATE/TIME 04-11-91/0810
темР, 50 F. DE	RILL RIG MOBILE B-53 A	TV DRILLER	JAG STARTED	1400/04-12-91	COMPLETED 1000/04-15-91
LOCATION / COORDINATES _	N: 552,193.5 E: 696,	308.4		TIME / DATE	TIME / DATE
·		MATERIALS IN	NVENTORY		
WELL CASING 4	in. dia. <u>17,5</u> j.t. W EL	L SCREEN4	_ in. dia,101.f.	BENTONITE SEAL ENV	PROPLUG BENTONITE CHIPS
	1 40 PVC SCR				
JOINT TYPEFLUS	H THREADED SLO	T SIŽE0.010" I	MACHINE SLOTTED	FILTER PACK QTY	450 LBS.
	NONE CEN				
	N/A DRI				



Golder Associates

	МО	NITORING WELL INSTAL	LATION L	.OG
				OW-49A SHEET 2 of 2
GA INSP	MRS PRILLING METHOD	6-5/8" ID x 10" OD HSA		
				66.42_ftDATE/TIME04-11-91/0810
		ILE B-53 ATV DRILLER JAG	STARTED14	100/04-12-91 COMPLETED 1000/04-15-9
LOCATION /	COORDINATES N: 552,193.		57	IME / DATE
WELL CASING	4in_dia17./	MATERIALS INVENTO I.f. WELL SCREEN4in. dio		TONITE SEAL ENVIROPLUG BENTONITE CHIP
		SCREEN TYPE SCH 40 PVC		ALLATION METHOD GRAVITY
JOHNT TYPE .	FLUSH THREADED	SLOT SIZE 0.010" MACHINE	SLOTTED FILTE	
		CENTRALIZERSNONE_USED		
		DRILLING MUD TYPE N/A		
DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH		INSTALLATION NOTES
<u> </u>		25.00		<u> </u>
	BORING TERMINATED AT 28.0 FT. BELOW GROUND	bottom	— caved [Adjacent to well OW-49 hole not
	SURFACE	of borehole		sampled.
30.00		<u>E</u>	E	
55.00		!	EI .	Collar elevation refers to top of
1		E	Ę	PVC riser.
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		£	L.	
		<u> </u>	Ę	WELL DEVELOPMENT NOTES
5.00			H	Well developed on 04-16-91 and
		F I	ţ.	
			H	250 gallons of water were removed
		!	E	using a centrifugal pump with black
		H	Ħ	polypropylene tubing.
			El	The well recharged instantly,
		<u>E</u> l	El	PH and conductivity stabilized with
		F }	ļ.	values of 5.89 and 1300 umho/cm
			E	respectively.
0.00		\$1	FI	
		El .	ļ.	
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5.00		t	H	
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JOB NO. <u>B93~6255</u>	PROJECT INDUS	TRI-PLEX/WOBURN/	MASS	WELL NO	0W-50	SHEET1 of3
GA INSP. DSL	DRILLING METHOD	8" ID x 12" OD HS	A	GROUND EL	Ev. 66.8 ft.	WATER DEPTH11_ft
WEATHER SUNNY	DRILLING COMPANY	D.L. MAHER		COLLAR EL	EV. 68.38 ft.	DATE/TIME04-08-91/0815
TEMP. 75-85 F.	DRILL RIG BRAT 2	2R DRILLER _	JRM	STARTED _	1400/04-08-91	COMPLETED 1200/04-09-91
LOCATION / COORDINATES	N: 552,001.1 E: (96,357.8			THE / DATE	TIME / DATE
		MATERIALS	INVENTORY			
WELL CASING 4	in. dig41.5 i.i	WELL SCREEN 4	in. dia10	i.f. E	BENTONITE SEAL EN	NVIROPLUG BENTONITE CHIPS
CASING TYPESC						
JOINT TYPEFLU	ISH THREADED	SLOT SIZE0.010	" MACHINE SLOT	TED	FILTER PACK QTY _	600 LBS.
GROUT QUANTITY	150 GALLONS	_ CENTRALIZERS	NONE USED	f	FILTER PACK TYPE	#20 OTTAWA SAND
GROUT TYPE						
		· · · · · · · · · · · · · · · · · · ·				

DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
	Odey Room Session Hom	2.00expanding end cap	F
0.00	GROUND SURFACE	1.50 1.30 0.50	Coltan elevation refers to top of
	0.0-12.5 ft. Compact, brown, c-f SAND, trace- little gravel, trace sitt. (SP)	3.50 Cement Control Co	
5.00		volciay grout →12" borehole 4" sch 40	
10.00	≪ILL>	PVC riser 04-06-91 0815	
15.00	12.5-56.3 ft. Loose-dense, beige brown to grey, c-f SAND, little grovel, trace silt. (SP)		WELL DEVELOPMENT NOTES Well development started on 04-15-9° and completed on 04-17-9°. 1400 gallons of water were removed using a submersible pump and black polypropylene
20.00			tubing. PH and conductivity stabilized with values of 5.84 and 2800 umho/cm respectively.
25.00	CONTINUED ON NEXT PAGE.		

JOB NO. 893-6255 PROJECT	INDUSTRI-PLEX/WOBURN/MASS	WELL NOOW-50	SHEET 2of 3
GA INSP. DSL DRILLING METHOD .	8" ID x 12" OD HSA	GROUND ELEV. 66.8 ft.	WATER DEPTH 11 ft.
WEATHER SUNNY DRILLING COMPANY.	D.L. MAHER	COLLAR ELEV. 68.38 ft.	DATE/TIME 04-08-91/0815
TEMP. 75-85 F. DRILL RIG B	RAT 22R DRILLER JRM	STARTED 1400/04-08-91	COMPLETED 1200/04-09-91
LOCATION / COORDINATES N: 552,001.1	E: 696,357.8	TIME / DATE	TIME / DATE
1	MATERIALS INVENTO	RY	
WELL CASING 4 in. dia41.5		10 I.f. BENTONITE SEAL	NVIROPLUG BENTONITE CHIPS
	SCREEN TYPE SCH 40 PV		
JOINT TYPE FLUSH THREADED	SLOT SIZEO.010" MACHINE	SLOTTED FILTER PACK OTY.	600 LBS.
GROUT QUANTITY	CENTRALIZERS NONE USEE	FILTER PACK TYPE	#20 OTTAWA SAND
GROUT TYPE VOLCLAY	DRILLING MUD TYPE N/A	INSTALLATION WETH	00 GRAVITY

DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
F	12.5-56.3 ft. Loase-dense, beige brown to grey, c-f	volclay grout	Collar elevation refers to top of PVC riser.
30.00	SAND, little gravel, trace silt. (SP)		<u> </u>
<u> </u>		-12" borehole	
Ė		4" sch 40 PVC riser	
ļ.			-
35.00			
00.00		36.00	
Ė		bentonite	
<u>-</u> -	` l		-
Ė		#20 Ottowa	-
		40.00 sand	
: 40.00 :			
į.			
-			-
•		4" sch 40 PVC 0.010" slotted screen	
		sioned screen	WELL DEVELOPMENT NOTES
45.00			Weil development started on
			04-15-91 and completed on 04-17-91, 1400 gallons of water
<u> </u>			were removed using a submersible
<u>.</u>			pump and black polypropylene tubing
•			PH and conductivity stabilized with values of 5.84 and 2800 umho/cm
50.00		50.00 threaded end plug	respectively.
-		51,50	
	·	bentonite	
		53.50 seal	
•			
55.00			
<u>.</u>	<outwash sand=""></outwash>		
	CONTINUED ON NEXT PAGE.		

	MONE	TORING WELL INS	FALLATION LOG	
GA INSP WEATHER TEMP	DSL DRILLING METHOD	8" ID x 12" OD HSA D.L. MAHER T 22R DRILLER JRM	WELL NO. OW-50 GROUND ELEV. 66.8 IL. COLLAR ELEV. 68.38 ft. STARTED 1400/04-08-91 TIME / DATE	
CASING TY JOINT TYPE GROUT QUA	PE	SCREEN TYPE	NTORY 10 I.F. BENTONITE SEAL ET PVC INSTALLATION METHO INTER PACK GTV. JSED FILTER PACK TYPE N/A INSTALLATION METHO	600 LBS. #20 OTTAWA SAND
DEPTH	SOIL/ROCK DESCRIPTION 56.3-76.5 ft. Compact- very dense, alive green to grey, c-f SAND, trace-	WELL SKE	coved	LATION NOTES

DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
60.00	56.3–76.5 ft. Compact– very dense, olive green to grey, c–f SAND, trace– some silt, little gravel. (SP–SM)	caved	Collar elevation refers to top of PVC riser.
65.00			
70.00			
75.00	<galcial till=""> AUGER REFUSAL—BORING TERMINATED AT 76.5 FT.</galcial>	76.50 bentonite	WELL DEVELOPMENT NOTES Well development started on 04-15-91 and completed on 04-17-91. 1400 gallons of water were removed using a submersible
80.00	BELOW GROUND SURFACE.		pump and black polypropylene tubing PH and conductivity stabilized with values of 5.84 and 2800 umho/cm respectively.
85.00			

JOB NO	893-6255 PROJECT 1	NDUSTRI-PLEX/W	OBURN/MAS	S	WELL NO	OW-50A	SHEET1612
	DSL DRILLING METHOD						
	FAIR DRILLING COMPANY						DATE/TIME
ТЕМР.	55 F. DRILL RIG BR	AT 22R	RILLER	JRM	STARTED08	300/04-12-91 TME / DATE	COMPLETED
LOCATION	/ COORDINATES N: 552,007.0	E: 696,353.3				IME / DATE	TIME / DATE
Į .			RIALS IN				
WELL CASI	NG <u>4</u> in. dia. <u>20.0</u>	I.f. WELL SCREEN	4	in. dia			
	PE SCH 40 PVC				C INST	ALLATION METHO	D GRAVITY
	FLUSH THREADED						
	ANTITY 70 GALLONS						
GROUT TYP	VOLCLAY	DRILLING MUC	TYPE	N/A	INST	ALLATION METHO	D GRAVITY
05074	500 DOOU 05000 DO		WELL S	NE TOU		INICTAL	LLATION NOTES
DEPTH	SOIL/ROCK DESCRIPTION	<u> </u>			ding end cop	INDIA:	ELATION NOTES
.		<u> </u>	1.50	المراجع	6" steel cosing		
Ė			1.40	H .	with locking cop	Adjacent to	well OW-50 hole not
ŀ		[]	0.30	1 #	20 Ottowa sand weep hole	sompled	
	GROUND SURFACE		W V 1	Ø~~	,		
0.00		E.	~~ \	NA A	† —cement ⊩	Collar elevat	tion refers to top of
ŧ	FOR SOIL DESCRIPTIONS	E	↑ ↑ ↑	X v	1	PVC riser.	
	SEE LOG OW-50.	[] ,	∇ ∀ ∀		1		
-	[E	~~ <u>~</u>	∏ _₹ ₹	1		
ţ		3.50			1/4"]	
F.					bentonite -		
ţ		ţ		1///	pellets	<u> </u>	
5.00					: E		
		ŧI			1 :	 	· · · · · · · · · · · · · · · · · · ·
		E		1//	voiclay [
-		t			1 9,501		·
-				1///	1	<u></u>	
ļ.		‡		1///	-12" borehole		
		El			Dorenoie		
ļ.				V///	1 :		
10.00					1		
<u>.</u>		3 10.8 ft.			i t		
-		04-12-91 1030		4//	4" sch 40	 	
Ė		E		1///	PVC riser		
F]		<u> </u>
Ė		E			i E		
-		-			-	WELL DE	VELOPMENT NOTES
		<u> 14.50</u>			ł		TECO! MEITT ITO IEO
15.00		F	\bowtie		bentonite	Well develop	ed on 04-15-91 and
-					seal		of water were removed
		<u>16.50</u>	<u> </u>	XXX	1	using a cen	trifugal pump and black
		F.	1. 1		#20 Ottawa	polypropylen	• • • • • • • • • • • • • • • • • • • •
		F)			sand		ductivity stabilized with
		18.50	┥╸╶┼—	4		values of 5.	46 and 1800 umho/cm
-		El] [respectively.	
<u> </u>		Ė]]		
20.00		F]	}		
Ė		Ė			La" ann an F		
		El	1 H	-	4" sch 40 PVC 0.010"		
E		<u>E</u>		<u> </u>	slotted screen		
ļ .		<u> </u>			1 E		
Ė		E		_	}		
<u> </u>		<u></u>		_	į F		
È "		<u>E</u> l		<u>-</u>]		
25.00		F		<u> </u>] [
ļ.		 		-	1 F	I	
E		E		-] E		· · · · · · · · · · · · · · · · · · ·
ŀ	CONTINUED ON NEXT BACE	F)	1	⊣	1 F		

JOB NO. 893-6255 PROJECT	INDUSTRI-PLEX/WOBURN/MASS	WELL NO. OW-50A	SHEET2of2
GA INSP. DSL DRILLING METHOD	8" ID x 12" OD HSA	GROUND ELEV. 66.5 ft.	WATER DEPTH 10.8 ft.
WEATHER FAIR DRILLING COMPANY	D.L. MAHER	COLLAR ELEV. 68.00 ft.	DATE/TIME 04-12-91/1030
	O E: 696,353.3	STARTEDOBOO/04-12-91 TME / DATE	COMPLETED 0830/04-15-91
MELL DATING 4	MATERIALS INVENTO		ENVIROPLUG BENTONITE CHIPS
CASING TYPE SCH 40 PVC	SCREEN TYPE SCH 40 PV	C INSTALLATION METH	OD GRAVITY
JOINT TYPE FLUSH THREADED	SLOT SIZE0.010" MACHINE	SLOTTED FILTER PACK OTY	400 LBS.
GROUT QUANTITY 70 GALLONS	CENTRALIZERSNONE_USED	FILTER PACK TIPE	#20 OTTAWA SAND
	DRILLING MUD TYPEN/A		

			· · · · · · · · · · · · · · · · · · ·
DEPTH	SOIL/ROCK DESCRIPTION	WELL SKETCH	INSTALLATION NOTES
30.00	BORING TERMINATED AT 29.0 FT. BELOW GROUND SURFACE	28.50 29.00 28.50 PVC 0.010" slotted screen #20 Ottawa sond threaded bottom of borehole	Adjacent to well OW-50 hole not
35.00			
40.00			
45.00			WELL DEVELOPMENT NOTES Well developed on 04-15-91 and 180 gallons of water were removed using a centrifugal pump and black polypropylene tubing.
50.00			PH and conductivity stabilized with values of 5.46 and 1800 umho/cm respectively.
55.00			

APPENDIX D

Well Development Forms

JOB NAME FLOURT P WO BUT NO. 00 43
DEVELOPED BY mike Zarenski DATE OF INSTALL 4/3/91 SHEET LOF 2
STARTED DEVEL 4/5/91 / 1155 COMPLETED DEVEL 4/12/91 / 1600
W.L BEFORE DEVEL 6.20' / 4/5/91/ 1144 AFTER DEVEL DEPTH DATE TIME
WELL DEPTH: BEFORE DEVEL 15.7 WELL DIA. (In) 4"
STANDING WATER COLUMN (FT.) 9.5 STANDING WELL VOLUME 6.19 goi,
SCREEN LENGTH 5 DRILLING WATER LOSS 400 gal.

	AOMINE	FIEL	PARAM	ETERS		
DATE/THE	REMOVED (GALS)	SPEC, COND. (umhoe/orn)	TEMP. (C°)	pH (s.u.)	OTHER	REMARKS
1/5/91/1155	6.0	380	17.8	6.79		Very Turbid,
						well wentdry
1220						DT W 2 15.0'
						well recharging
						extremely slow
1445						DTW = 14.0'
4/8/91 1220	6.00	840	וו_ד	6.95		Very Turbid
419191 959	15	1300	10.5	6.62		Very Turbid
	15.5	13'00	11,8	6.71		Very Turbid
4/10/91 8					10.81	,
Aliolai B45	16.5	1600	ප.ප	اعا وا		very turbid .
Alsolas 850	18.5				,	Very turbid
	18.5	TOTAL V	olume f	REMOVED	(gal.)	

DEVELOPMENT METHOD: First round of development done with Centrified Pump, after that all development Performed with a watera foot value and Polyethyle. Tubing. Well Pumped dry during each cycle of dry-elopment.

- . . .

JOB	NAME	15RT/WO	burnIMA	J OB	NO₹?	3-1-255	WELL NO. QW-44
ľ							4 1 11/91 SHEET OF
STA	RTED DEVE	4/16	19! 154/ DATE TIME	2— com	IPLETED (DEVEL .	4/16/91 1545 DATE TIME 2-88 4/16/517 (807) DEPTH DATE TIME
W.L	BEFORE D	LAGUE DEPTI	H DATE	THE	AFTER	DEVEL.	DEPTH DATE TIME WELL DIA. (In)
							ME - 9.5 gol.
							gal.
	<u> </u>	VOLUME	FIELD	PARAM			
0	ATE/TIME	REMOVED (GALS)	SPEC. COND. (umhos/om)	Temp. (C°)	pH (a.u.)	OTHER	REMARKS
	4/3/11 15"	loal	1150	ΝA	5.75		
	(१८४)	Spal	[150		5.45		" Script leng." shiptered
	1554	Megl	3700		5.56		" shiphere
	IGM	7000	1330		5.45		1 Color or "tong smell.
	1605	Zhoal	5200:		5.47	.	tong smel.
	1610	2596	300€	1	5.23		
	1615	3000	2550		5.15		
	11.25	40,00	2870		5.49		
	1635	Suden	1580		5.19		
-	17-18	(1) och	1800		5.27	· · ·	
	1730	7000	1750		502	·	
	1737	75,0	1850		5.30		
· .	1745	80 960	1840		5.38		
<u> </u>	·			V	لــــا		
		80	= TOTAL V	OLUME F	REMOVED	(gal.)	
DEV	ELOPMENT	METHOD:	Valena	Jump		•	
ζı.	:21 &	43:00		· · · · · · · · · · · · · · · · · · ·		<u>. </u>	
190	~ 1 3 1						
TON	ES: 11/50c 30suc 60suc	2.35 2.35 2.35	2 min 4.00 4 min 3.00 8 min 3.00	15.	m 2	.88.	

						
JOB NAME 王·	dustri Plu	uoburn Mas	<u> </u>	3 NO. 🙎	93-62 3	55-16 WEL NO.0ω-40
DEVELOPED BY	mike	Zarenski	DA	TE OF IN	STALL 3	SHEET LOF Z
STARTED DEVE						4/12/91 / 1530
W.L BEFORE D	EVEL 3.3	2 /0947 H DATE	14 5 9	_ AFTER	DEVEL.	DEPTH DATE TIME
WELL DEPTH:	BEFORE DE	vel 13.5	, Al	FTER DEV	na 13	5' WELL DIA. (In) 4"
STANDING WAT	er colúmn	1 (FT.) 9.68	STA	NDING W	ETT AOM	IME 6.31 gal.
SCREEN LENGT	н	ā <u>'</u>	DRII	TING MY	TER LOS	s <u>100</u> gal.
		<u> </u>			· 	
	VOLUME		PARAM	ETERS		
DATE/TIME	REHOVED (GALS)	SPEC, COND. (umhos/om)	(C')	(err) bH	OTHER	REMARKS
4 5 91 1030	6.0					Slightly Turbid
		2				well went Dry
loso	9.0	300	16.1	7.46		Lacidly
					-	measured well
					-	Dept h = 13.5
						from Ground Surface
1200				<u> =</u> _		DTW = 11.5'
418 91 1345	21	8 20	9.9	7.33		water slightly
4 9 9 083	- 15	1500 *	10.1	7.11	690 540	Turbid
49991 0041	8ع	986	10.1	85.5		Water cloudy:
Alialganeral	23/2	1400	10.7	757	DTW 5.94	Water clear
4/10/91 0810	25	1800	8.9	7.70		Water claudy .
4 July 1000		7				Weber cloudy
	26,5	- TOTAL V	olume r	REMOVED	(gal.)	
* METER SET	AT 1000	vonge - read	ling not	reliable	•	
DEVELOPMENT A	METHOD:	·				·
					<u>· </u>	
·	·					
						- 1 12 12 12 12 12 12 12 12 12 12 12 12 1
410000 1 2 24 0		(1 0	- Parl 1	·*	- 12 6	
MOTES: Mayer	COTUME	wra e)	tion Cir	4) =	9.68	5 (Grand) - 3.82

JOB NAME = 100 Moss Mass JOB NO. 893-6255.37. WELL NO. OW 47
DEVELOPED BY mike Zarens K. DATE OF INSTALL 3/19-28/91 SHEET 1 OF 2
STARTED DEVEL 1055 / 1055 COMPLETED DEVEL 4 17 91 / 1636 W.L. BEFORE DEVEL 9.89 / FORE TIME AFTER DEVEL DEPTH DATE TIME
W.L BEFORE DEVEL 9.89 / FIRE AFTER DEVEL DEPTH DATE TIME
WELL DEPTH: BEFORE DEVEL L8_0 AFTER DEVELWELL DIA (In) 4"
STANDING WATER COLUMN (FT.) 8.11 STANDING WELL VOLUME 5.29 gal.
SCREEN LENGTH 5 DRILLING WATER LOSS 60 gol.
VOLUME FIELD PARAMETERS
DATE/THE REMOVED SPEC. COND. TEMP. PH REMARKS

1	VOLUME	RELI	PARAM	ETERS	4	
DATE/THE	REMOVED (GALS)	SPEC, COND. (umhee/om)	TEMP. (C°)	(au)	OTHER	REMARKS
4/8/91 - 1055	600 II	2800	17.1	6.49		Very Turbid
1991 901					9.98	HOTE! WATERRA THEING IN WELL WHEN WI TAKEN
4/9/91 904	160 5/0	∂5 0 0	11.4	6.42		JERY TURBIO
49 by 908	140 B	2600	10.1	10.44		YERY TURBIO
49191909	160 SP	2500	9.4	6.46		VERY TURBIO
AKI':1 0915	llgal	2.500	11.0	6.63	-	Very Turbid
14 121 0905					11:01	
410 91 crio1	10051	2005	8.1*	4.72*		VERY TURPHO
the fer oan	15021	<i>0000</i> .	BL	10.01		VETY TURBU
H12121 0207	llagate	> C1050	8.0	6.59		TURRID
Alway cazo	1800	₹20°50	5.8.	6669	/	TURBID"
1039	1999	£2650	8.2	6.54	organica (Mili) Co	- Slightly Tirbid
1042	23991	~2600	8,3	6.58	·	Slightly Turbid
1043	24			<u> </u>		Slehtly Turbid
	24	= TOTAL V	OLUME R	EMOVED	(gal.)	

DEVELOPMENT METHOD:	First Cycle of develop	ment completed using
		performed Using a
watera foot valve and		

NOTES:

ons

WELL DEVELOPMENT FIELD RECORD

DEVELOPED BY DOLL 20 CERSES DATE OF INSTALL 3/27/91 SHEET 1 OF 7

STARTED DEVEL 4/4/91/1537 COMPLETED DEVEL 4/5/91/14/5

W.L BEFORE DEVEL 170'/4/4/91/1202 AFTER DEVEL 8.0'

WELL DEPTH: BEFORE DEVEL 46.0'

STANDING WATER COLUMN (FT.) 38.3' STANDING WELL VOLUME 74.97 gol.

SCREEN LENGTH 10'

DATE TIME

AFTER DEVEL WELL DIA. (In) 4'

SCREEN LENGTH 10'

DRILLING WATER LOSS 575 gol.

		VOLUME	กยน	PARAM	ETERS		
DATI	E/THE 1537	REMOVED (GALS)	SPEC. COND. (umhee/om)	TEMP. (C°)	(errr)	OTHER	REMARKS
414	1450	25	1700	13.0	5.72		very Torbid
414	1540	2 .5	1650?	12.6	5.57	8.0'+	o water
	1542	50	920	12.5	5.57		
	1544	ם כ	920	12.6	5.58	8.2'	towater
	1545	90	OSP	12.7	5,58		
	1546	115	930	12.6	5.58		
	1548	150	940	12.6	5.58		water beginning
	1550	180	940	12.8	5.57		to clear @ 140 gal
	1552	200 ·	.940	12.6	5-53		
L	1620	2 50	960	12.7	5.59		Resumed pumping after discharging hater
	623	300	95.0	12.7	5.59		
	1627	350	950	12.5	5.59		water level
	1631	400	960	12.6	5.59		
	1800	450	960	17.6	5.55		
		450	- TOTAL V	OLUME F	REMOVED	(gal.)	

DEVELOPMENT METHOD: Used a gas operated centrifigul

Pump with I'' black poly Tubing lowered

to the well bottom. Tubing surged during

Acyclopment

NOTES: Water level meter Probe continuously in well. Water level did n't fluctuate substantially.

							
JOB 1	MAME I	Joustin P	LEX	JOB	NO	893-1	10255 WELL NO. CW4F
DEVEL	LOPED BY	<u>STEPHE</u>	JA. WHEELER	DA1	TE OF IN	STALL 🎝	blesign sheet 1 of 1
	TED DEVE			cor	APLETED	DEVEL.	44191 1512
		EVEL TOO					. -
WELL	DEPTH: 1	before de	vel Clo. 14.	ST AF	TER DEV	ÆL	WELL DIA. (In) 4"
STANC	ING WAT	er Colúmn	(FT.) <u>18.6</u>	ATS	NDING W	ETT AOTA	IME 12.19 gol.
SCREE	N LENGT	н н	O.F.	DRIL	TING MY	TER LOSS	s <u>125</u> gal.
			FIEL	PARAM	ETERS		
DATI	OATE/THE REMOVED (GALS)		SPEC. COND. (umhee/om)	TEMP. (C°)	(e.u.)	OTHER	REMARKS
44	450	~5	5000	1A.1	5.13		DARK YORY THREID
44_	1452	<u>30</u>	දීරතර	13.3	5.70		SAMUE DARK LESS TURBED
14	1454	70	.0081	13.8	501.0		SAMPLE CLOUDY
44	456	90	1750	15.9	541		EAMPLE CLEAR
74	M59	125	1750	15.6	5.34		SAMPLE CLOUDY
44	1500	150	_1800_	15.8	5.30		SAMPLE CLEAR
4/4	1503	190	1800	8.9	5.83	NL -	SAMPLE CLEAR
4/4	1504	015	1800	12.10	5.21	8.05	SAMPLE PLEAR
4/4	1508					7.90	WELL RECOVERS
4/4	1510					7.85	INSTARTLY
4/4	5/8					7.80	
-	530	215	1800	13.5	5.32		Clear water
-	<u>। इत्र</u> ा	2 15	1800	12.6	5.33		Clear water.
-		215	- TOTAL V	OLUME R	EMOVED	(gal.)	
						·,	
DEVELO	OPMENT I	METHOD:	THE W	ELL WA	S DEN	eloșed	WTILIZING A CENTRIFUGAL
٠		ITU BLACE			2H)ATTA		INCERTED TO THE
P	AGE OF	THE W	eu. 215	GALS !	were f	SEMOU'ED	AND FIELD PARAMETERS
	JERE A	MALYZEO	PERIODICALLY	THOSO	Тлона	THE T	EVELOMENT.
		·	ţ.				
NOTES:		••					

SEP AZIND LUIDO MULULA ...

JOB NAME IN	<u>OUSTRIPLEX</u>	WOBURN 1	MA JOB	NO. 89	3 625	5 WELL NO. OW-194
DEVELOPED BY		1	DAT	e of ins	TALLAL	2-15 91 SHEETOF
STARTED DEVE	4/14	191 11130	сом	PLETED !	DEVEL S	4/16/91 / 1350
	' D	IATE TIME	112 m			DATE TIME
W.L. BEFORE D	EAET DEBU	H DATE	TIME	- ATTER	DEVEL.	DEPTH DATE TIME
WELL DEPTH: 1	BEFORE DEV	rel 27.5	AF	TER DEV	EL _27	1.5 WELL DIA. (In) 4 17
STANDING WAT	er Colümn	(FT.) 17.3	6 STAI	NDING WE	TT VOLU	ME gol.
		• •				gal.
SCKEEN LENGTH	П <u></u>		DKIL	אק טאנו	IEN LUSS) gal,
	E 444 A 43 45	FIELD	PARAM	ETERS		
DATE/THE	VOLUME REMOVED (GALS)	SPEC. COND. (umhos/om)	ТЕМР. (C°)	(err)	OTHER	REHARKS
4/16/91/1130	20	1650	16.2	5.95		Very turbed
(335	190	1400	14.3			Turbid
/350	90	/300	14.6	5.89		Turbid
}		`				
}						
						·
						,
` .						
					<u>. </u>	
	250	- TOTAL V	OLUME R	EMOVED	(gol.)	
DEVELOPMENT	METHOD:	Develo	ped	using.	C.Ph	Irifigul pump
		· · · · · · · · · · · · · · · · · · ·				
NOTES:						·

[
JOB NA	WE 10	OUSTRIPL	EX WOBURN A	MA JOB	NOE	93 C 25	5 WELL NO. ON 50
l				•			SHEET 2 OF 3.
							4/17/91/1649
W.L. BE	FORE D	EVEL 13.7	O PHISTIPI P	THE	- AFTER	DEVEL.	DEPTH DATE TIME
WELL D	EPTH: E	BEFORE DEV	Mel51.5	AF	TER DEV	e. <u>51</u> ,	S WELL DIA. (In) 4"
STANDII	NG WAT	ER COLUMN	(FT.)	\$TAI	ADING ME	IT AOTA	ME gol.
							2325 gal.
						·	
		AOMINE	FIELD	PARAM	ÉTERS		
DATE	THE.	REMOVED (GALS)	SPEC. COND. (umhos/om)	TEMP. (C*)	(e.r.)	OTHER	REMARKS
4/16/9	10827	70	2440	13.7	6.39		ON 50 Slightly tubil
	1010	150230	2200	15.7	6.20		slightly turbid
	1020	50	2275	14.7	6.18	<u> </u>	turbid
	1030	- 60	2290	15.5	6.14	·	Slightly turbid
	1046	30	22/0	14.6	5.99		Slightly turbed
	115	40	2700	14.8	5.95		turhid
	3 15	40	2400	14.9	5.90		slighly turbid
14	-30					,	W.L. Q 13.08'
	1150		* -			1.61	
4178	11134	5	2700 .	P.OÍ	5.79	• •	WATER CLEAR WISLAMIRED
ALIK	11138	45	6800	10.6	571		WATER CLEAR
41719	1 1345	00	pumper	Hiw	batto ce	nt . e	CENT PHAP VERY THEBIO
Alik	11404	4 5	2006	12.1	5,83		VERY THEBIO
41710	11 1415	55	2865	12.5	5.86		VERY TUKBID
		670	- TOTAL V	OLUME F	REMOVED	(gal.)	
DEVELO	PMENT,	METHOD:	10			•	
					·	<u></u>	· · · · · · · · · · · · · · · · · · ·
١	:		··········	÷			eri-
NOTES.	<u> </u>		TO gallo	15 0 5	4		
140123:	1-3-44		3				

JOB NAME	ISRT		J OB	NO. <u>8</u>		255, 37 WELL NO. OW-SOA
					TALL	CIET OF L
STARTED DEVE	1 4/15	ATE THE	COM	IPLETED I	devel 1	DATE TIME
W.L. BEFORE D	EVEL 12	7014 15 911 H DATE	1520	- AFTER	DEVEL.	DEPTH DATE TIME
WELL DEPTH:	BEFORE DE	VEL	AF	TER DEV	EL	WELL DIA. (In)
STANDING WAT	ER COLÚMN	(FT.)	STA	NDING WE	ELL VOLU	ME gol.
SCREEN LENGT	н	· · · · · · · · · · · · · · · · · · ·	DRIL	TING MY.	TER LOSS	3 <u>175</u> gal.
	AOMINE	FIELD	PARAM	ETERS		
DATE/THE	REMOVED (GALS)	SPEC. COND. (umhoe/om)	TEMP. (C°)	(rrr) bH	OTHER	REMARKS
4115 91		<u> </u>				
1525	1	1600	12.9	6.74		
1530	-60	1600	10.8	5.47		Classic Track d
	117	1800	10.4	5.50		Slightly Turbid
1550	180	1800	10.7			rear
		,	 			
		•				
`		·				
		- TOTAL N	MINE 6	EVOVED	(00)	
L.		= TOTAL V	ULUME !	KEMUYEU	(601.)	
DEVELOPMENT	METHOD:	Well	D 9	بولو	ped.	using
Polyeth	1.10.	Tubing	7. 6V	11.60	UL P	umpand
	y					
NOTES:						•
	•					

APPENDIX E

Chain of Custody Forms

	-			FORM (CC1) Date Se		91/04/05	By:i.iid
C	ompan	ıy: <u>C/C</u>	INDUS	RI-PLEX SITE_	_ Attn.:	GULDER AS	SOCIATES, INC
Fac	:ility/Sit	te:			Phon	e: (617) 938	- U530
	·	INT		ON OF COMMERCE WAY & OLBO1	_		
				SAMPLE IDENTIFICATION	N		
Fac	ility:	ا انا	L D I Facility/Si	SIRITI			
Sarr	nnie Po		OW1-1			FISIO	!
-	.p.c . o	Source Co	de Yo	our Sample Point ID Start Date (tell justify) (YY/MM/DD)		itart Time Elapsed XI hr. clock) (comp	
	urce Code	s: Outfall	(O) Fat		bata C	Mastion Co	iba.
	ell (W) il (S)		• •	eration Point(G) Treatment Facility(T)	Lake/Ocean	(L) Sp	pecify
				SHUTTLE CONTENTS	<u> </u>		
No	Type	Size	Preserv.	ANALYSIS	FIIL (Y/N)	SAMPLER Observations	LAB Observations
	MET	1000	ниоз	METALS V	Y	·45 MICCON	/
					У	FICTER USED	/
1	CLINS	125	H2SO4	TOC/COD /		rice wes	1 2
1	CONS	1000	H2SB4	NH3/TKN /	Υ		V
1	CUNL	125	NUNE	SOLIDS/TD 🗸	N		
1	итв	40	GC/MS	TEMPERATURE MEENE WHEN			
				CHURRYO STITUMO			
		-					
					 -		
		•	-		 		
					-		
	Chut	tla Open	ed By: (pri	CHAIN OF CUSTODY CHRO	Date:	<u> </u>	Time: 1050
1.	1	ature:	eu by. (pir :: #	TEMEN A. WHEELER	_	<u>410409</u> ::0189341	Intact: 1054
—		_	d these m	aterials in good condition from the abo			. 4 /
	Nam	e:	_	_	Signatu	# 17 / /	I Les
2.			PAVID S		B		The state of the s
	Date		771		Remark		
	I hav		ed these m	aterials in good condition from the abo	ove pers Signatu		
3.	'''	·. —				-	301
	Date			Time:	Remark	s:	
4.	Shut	tle Seale	d Byf April	DAVID IS. LET	Date:	4/17/21	Time: <u>153</u>
→.	Signa	ature:	ALVIL	had bled	_ ≱eal∻	189342	Intact:

AIN	OF CL	STODY	FORM (CC1)	Date S	Sealed	91/04/05	By: ^{նվև}	
ompa	iny:	INDUST	RI-PLEX SITE	•	Attn.:	GOLDER AS	SOCIATE	S, INC.
ility/S	ite:	COCCOT I	ON OF COMMERCE	HAU	Phone	(617) 938	- 0530	·
Addre	ess: ATL	ANTIC A	NUENUE, WOBURN,	MA 01801	_	·		
-			SAMPL	E IDENTIFICAT	ION		-	
ility:			S R T		(Optional S	ample Point Descriptions)	······································	
nple P	oint: M-	- OWI - 1	/12 1 1 1 1 1 Dur Sample Point ID	91/04/1	<u>8</u> \$	9 4 0 Ligand	Hours	
urce Coo	(from belo		(left justify)	(YY/MM/DD)	_	D hr, clock) (comp	osite)	
all(W) all(S)	Outfall			Impoundment(I) ent Facility(T)		illection Sys(C)		х
	111701101101			TTLE CONTENT			,	
T ** **	BOTTLE		ANALY			SAMPLER		LAB
Type	Size	Preserv.	<u> </u>		Filt (Y/N)	Observations	1	servations
MET	1000	HNO3	METALS .		Y	.45 MICRON	V,	1 -4 ONE
CUNS	125	H2504	TOC/COD •	···	У	FILTER USED	<u> </u>	more pre
CON	1000	H2S04	NH3/TKN •		у		1	1 HI
CON	125	NUNE	SOLIDS/TD+	-	N			
					- 73			
	-							
	*			<u>,</u>				
	1							· · · · · · · · · · · · · · · · · · ·
			-					
<u> </u>				CUSTODY CHR	ONICLE			
1		ed By: (pri	111114 -0116		Date:	418 191	Time:	1638
	nature:	Micha			Seal #		Intact: _	
Nan		ea tnese m	aterials in good cond	ition from the at	Signatur			
Date	e:		Time:		Remarks	3:		
į.		ed these m	aterials in good condi	tion from the at				
Nan	ne: 	·			Signatur	e:	: 	30
Date	e:		Time:		Remarks	::		
Shu	ttle Seale	d By: (prin	t) MIKE ZARENS	SKI	Date:	4/18/91	Time:	1005
1	nature: ħ				Seal	187356	Intact:	1/

TAIN		ental Testing ication Corp. JSTODY	FORM (CC1)	Date Sealed	91/04/05	By: WW			
wompa	PTV:		AT-PLEX SITE	Attn.	GOLDER AS	SOCIATES, INC.			
liitv/Si	ito:		OR OF CONTRACT CARE		(417) 938	- 0530			
Addre	SS: ATL	ANTIC A	WENUE, WOBURN, MA	eteel®	***				
			SAMPLE IDEN	TIFICATION					
cility:	G C	L D I	SRT	(Cottonal	Sample Point Descriptions				
iple Po	Source Co (from belo	0.WI-1	4121 1 1 1 91/1 sur Sample Point ID	014 18 0 Start Date	BISIO LI	nd Hours posite)			
ill(W) il(S)	Outfall River/Stree	• •		/(T) Lake/Ocear		pecify(X)			
	BOTTLE		SHUTTLE C	ONTENTS	SAMPLER				
Туре	Size	Preserv.	AFIALYSIS	FIRE CYIN		LAB Observations			
MET	1800	HN03	METALS .	Y	·45 HILRON	V			
CUNS	125	H2S04	T0E/C0D •	у	· 45 HILLON FILTER USED	V			
CONS	1080	H2504	NH3/TKN *	У		More pre			
CONL	125	NONE	SOLIDS/TD .	N		V 05 4			
υтв	40	GC/MS	TEMPERATURE .			,			
<u> </u>		<u> </u>							
,			•		<u> </u>				
1 1									
	Ş					,			
			CHAIN OF CUSTO						
Shuttle Opened By: (print) M. Ke Zarens K. Signature: McQ. O ZareQ.				Date:	418191	Time: 1638			
I hav	receive		aterials in good condition fro	m the above pers Signatu	on.	7			
Date):		Time:	Remark	s:				
I hav		d these m	aterials in good condition fro	m the above pers Signatu		706			
Date: Time:				Remark	Remarks:				
Shut	tle Seale	d By: (prin	I) HIKE ZARBNSKI	Date	4/18/21	Time: 1665			
ı	ature:	much	·	Seal		Intact:			

. ._ .

ETC CHAIN		-	FORM (CC1)	Seal No/8 Date Sealed		Job# <u>CA6472</u> .By: ผม
Facility/Sit	e:	EKSECTI	RI-PLEX SITE ON OF COMMERCE WAY & EVENUE, WOBURN, MA	Phone	<u>GGLDER AS</u> g: (617) 978	SUCIATES, INC. - 8530
			SAMPLE IDEN	TIFICATION		
Facility: Sample Poi	int: W- Source Cod (Irom below	ė Yo	4141 91116 our Sample Point ID S	\$ 4 / 7 / 1 start Date S		a Hours posite)
Well(W) Soil(S)	Outfail River/Stream		om Sediment (B) Surface Impoundm eration Point (G) Treatment Facility	ent (l) Leachate Co (T) Lake/Ocean		ther I pecify
			SHUTTLE CO	ONTENTS		
No Type	SIZE	Presery.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations	LAB Observations
1 MET	1000	ни03	TOTAL METALS	N		/
			•			
		-				
			CHAIN OF CUSTO	DY CHRONICLE		
1. Signa		d By: (pri	TRAL D. WANGL	Date:	PO PO 1P.	Time: 1054 Intact: YES
2. I have	a :		aterials in good condition from	m the above personatur	/ / /	lug hey
Date:		/9/	Time: /4-50	Remarks		
Name			Zionais in good condition not	Signatur		
Date:	·		Time:	Remarks	:	30'
4. Shutt		By: (prin	in DAVIDIS LEY	Date:	189342	Time: 1536
LAB USE ON SHUTTLE#				late: 4/8/ SEAL#1895	9 Time: 42 COND.	1000,

C Environmental Testing and Certification Corp. AIN OF CUSTODY	FORM (CC1) DE	ate Sealed	91/04/05	By: <u> </u>
ompany: C/O INDUSTR	I-PLEX SITE	Attn.:	GOLDER ASS	SOCIATES, INC.
	'		(617) 938	
INTERSECTION	N OF COMMERCE WAY &			
Address: ATLANTIC AL	ENUE, WOBURN, MA 018	01		
	SAMPLE IDENTIFIC	ATION		
ity: GOLDIS	R T	(Optional Si	emple Point Descriptions	
(from below)	Sample Point ID Start Dat (YY/MM/D	e 5t	art Time Elapsed Thr. closk) (dayper	
	h Sediment(B) Surface Impoundment stion Point(G) Treatment Facility		lection Sys. x; (C) = Oti	her
	SHUTTLE CONTI	NTS		
BOTTLE Type Size Preserv.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations	LAB Observations
	*		Observations	Coservations
MET 1000 HN03	TOTAL METALS .			V
			·	
4				
3 3 3 3 3	,			
				-
	CHAIN OF CUSTODY C	HRONICLE		<u></u>
Shuttle Opened By: (print		Date:	418191	Time: 1638
Signature: www.	ZannaSi	Seal #:		Intact: Y
I have received these ma Name:	terials in good condition from the	e above perso Signature		<u></u>
Date:	Time:	– Remarks	•	
I have received these ma Name:	erials in good condition from the	e above perso Signature		£
Date:	Time:	- Remarks		30
Shuttle Sealed By: (print)	MIKE ZARENSKI	Date:	4/18/91	Time: 1005
Signature: Michael		Seal #	189350	Intact: YES
	Date:	1771 00	721	UUI)



!	
	ETC JOB # <u>CA 65 63</u>
	Sample Point W OW-15101111
	Source Code Sample Point I.D.
FIELD F	ROCEDURES
ما لات الكالياناتاتات الساسناتاتاتاتاتاتاتاتاتاتاتاتاتاتاتاتاتات	1-13 LIZ4 LIJO -> Dry PSED HRS WATER VOL. IN CASING VOLUME PURGED
(YY MM DD) (2400 Hr Clock)	(Gallons) (Gallons)
SAMPLING METHOD:	
Sampler Type A-Submersible Pump D-Dipper/B B-ISCO E-Baller C-Bladder Pump F-Scoop/Si	X-Other
Sampler Material A A-Tefton C-PVC B-Metal D-Plastic	X-Other
Tubing Material A A-Tefton C-Polyethy B-Tygon D-Silicon	
Sample Composited Y	waste direct
	Procedure/Proportions
FIELD ME	ASUREMENTS
Well Elevation (ft/msl)	Well Depth (ft)
Depth to Ground water (ft)	Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)	
1st 5 7 / (STD) 1st 27 6 6	um/cm EH 182 MV
ph spec. conit.	(other parameter) value 7.5 units
ph spec. conf.	(other parameter) value units
	um/cm at 25°C (other parameter) value units
	um/cm It 25°C (other parameter) value units
191610	мти
Sample Temp Turbidity	
T	COMMENTS
	nge no odor
Weather Conditions: Cloudy 45F Wine	
Other: Purge vol = (3)(36.90)(6.652) \$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
Well Purged day, Aprex 150	ogallows removed over 2 days of
NB Well carried at time of	development development
Well not surveyed at to	ine of sampling.
FILTERING: Use Chain of Custody (CC1) to	
. /	C
(Print)	
certify that sampling procedures were in accordance	e with applicable EPA state and corporate protocols.
41491 mukar Zaman	- 311



#	ETCJOB# CAUS64
·	Sample Point W O W - H4 19 19 1 1 1 Source Code Sample Point I.D.
FIELD I	PROCEDURES
91116141118 Ø181113 L	1 · 1Z
Sampler Type E A-Submersible Pump D-Dipper/E	X-Other
Sampler Material A A-Teflon C-PVC D-Plastic	X-Other
Tubing Material 人市 A-Teflon C-Polyethy D-Silicon	X-Other (SPECIFY OTHER)
Sample Composited Y/N	Procedure/Proportions
FIEI D MI	ASUREMENTS
Well Elevation (ft/msl) Depth to Ground water (ft) Groundwater Elevation (ft msl)	Well Depth (ft)
1.	}
1st 6 4 6 (STD) 1st 836	um/cm EH 57 AV
2nd 6 15 (STD) 2nd 830	at 25°C EH 57 mV
3rd (STD) 3rd spec, sond.	unicm at 25°C (other parameter) value units
4th spec. cond.	unt/cm at 25°C (other parameter) value units
/ 0 • 3 (°C) Turbidity	J мто
FIELD	COMMENTS
Sample Appearance: Slightly turbid	no odor
Weather Conditions: Cloudy, 45°F	Ninds 5-10 mpl NE 0.652) 0.652 gal/ft 4° casing
Other: Pumpe $vol = (3)(17.24)(0.00)$	(52) 0:652 gel/ft 4" casing
= 33.72 gak	
FILTERING: Use Chain of Custody (CC1) to	indicate which bottles were filtered
erinu	Employer: Golder Assocs.
I certify that sampling procedures were in accordance	e with applicable EPA state and corporate protocols.
4/18/91 mulano Zonanoni	313

SHUTTLE CONTENTS BOTTLE P Type Size Preserv. MET 1000 HN03 TOTAL METALS CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Signature: Medical Signature: Medic	
Address: ATLANTIC AUE., WOBURN, MA 01801 SAMPLE IDENTIFICATION SAMPLE IDENTIFICATION Source Codes	-
SAMPLE IDENTIFICATION Common Content Common Comm	
CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Signature: CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Signature: CHAIN OF CUSTODY CHRONICLE Si	
The Point: W- O W - 4 19 4 1	
Source Code Source Codes: If the below in the below person. Source Codes: Shuttle Contents SAMPLER Filt. (7/N) Observations CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Date: Shuttle Opened By: (print) Date: Time: Time: Remarks: I have received these materials in good condition from the above person.	
CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Shuttle Opened By: (print) Signature: Seal #: [924]s Intact: I have received these materials in good condition from the above person.	
BOTTLE Type Size Preserv. MET 1000 HN03 TOTAL METALS CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print) Signature: MEDICAL Signature: Seal#: 192 415 Intact: I have received these materials in good condition from the above person. Name: Remarks: I have received these materials in good condition from the above person.	
Type Size Preserv. MET 1000 HN03 TOTAL METALS CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print)	LAB
CHAIN OF CUSTODY CHRONICLE Shuttle Opened By: (print)	bservations
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Diffe Zarenski Date: 4 18 91 Signature: Seal #: 192 4 15 Intact: I have received these materials in good condition from the above person. Name: Signature: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	·
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	<u>-</u>
Shuttle Opened By: (print) Diffe Zarenski Date: 4 18 91 Signature: Seal #: 192 4 15 Intact: I have received these materials in good condition from the above person. Name: Signature: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	
Shuttle Opened By: (print) Signature: I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	· .
Signature: Seal #: 192 4 15 Intact: I have received these materials in good condition from the above person. Name: Signature: Date: Time: Remarks: I have received these materials in good condition from the above person.	1434
I have received these materials in good condition from the above person. Name: Date: Time: Remarks: I have received these materials in good condition from the above person.	1634
I have received these materials in good condition from the above person.	
<u>-</u>	
Name: Signature:	
Date: Time: Remarks:	3
Shuttle Sealed By: (print) MIKE ZAKENSKJ Date: 4/18/91 Time:	1240

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	ETC JOB# -CA6489 CA6593 4/4
-	Sample Point X DIZIEIGIGI I I I
•	FIELD PROCEDURES
T	PURGE DATE (YY MM DD) (Gallons) VOLUME PURGED (Gallons) (Gallons)
#	SAMPLING METHOD:
-	Sampler Type
T	Sampler Material A-Teflon C-PVC X-Other A-Teflon B-Metal D-Plastic X-Other ARCIFY OTHER)
198	Tubing Material A-Teffon B-Tygon C-Polyethylene D-Silicon X-Other
	Sample Composited VN
1840	Procedure/Proportions FIELD MEASUREMENTS
T	Well Elevation (ft/msl) Depth to Ground water (ft) Well Depth (non-well) (ft)
T	Groundwater Elevation (ft msl)
كأنسم	
T	1st 6 5 0 (STD) 1st 1 6 el 25°C 6 (other parameter) value units
	2nd 6 - 3 7 (STD) 2nd 1 0 6 at 25°C (other persmeter) value units
· #	3rd (STD) 3rd spec. cond. uniform (Other parameter) value units
1	4th spac, cond. um/cm at 25°C (other parameter) value units
	Sample Temp Turbidity
_	FIELD COMMENTS
4	Sample Appearance: Clear, no odor
1	Weather Conditions: Cloudy, slight Drerze, 45°F
4	Other: distilled water transferred from 15 mailon
	- nalgene Container into bailer then to bottles
فند	filtered samples filtered using Transfer Vessel
T	used for all other wells
_	FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
	Sampler: Mike Zarenski Employer: Golder Assoc.
W	I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
	4/18/91 mula Zamensai

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Compar	ıy: <u>C∠ü</u>	INDUST	RI-PLEX SITE	Attn.	: GOLDER AS	SOCIATES, INC.
ility/Si	te:	EUGENTI	ON OF COMMERCE WAY	Phor	ne: <u>(617) 938</u>	- 0530
Addres			VENUE, WOBURN, MA	01801	T.	
			SAMPLE IDI	ENTIFICATION		
Tity:	<u>[610</u>	LIDIII Facility/Si	SIRITI L	(Optional	Sample Point Descriptions	
	Source Co (from belo	60 W1 - 14	4.7 9 ur Sample Point ID (left justify)		Start Time Etapage 400 hr. clock) (comp	
urce Code Hi(W) Hi(S)	Outfalt		om Sediment(B) Surface Impoueration Point(G) Treatment Fac		Collection Sys(C) Ot	ther
(3)	111761751166			CONTENTS		
Type	BOTTLE Size	Preserv.	ANALYSIS	Filt (Y/N	SAMPLER Observations	LAB Observations
MET			METALS *	V	OED WITH 45	
	1000	HNU3		V		
CUNS	_	H2SU4	TDC/COD •	1	MICHON IN-LI	
CONS	<u>1000</u>	H2S04	NH3/TKN •		FLITER (MINE	(rr ns to)
CLINU	125	NUNE	SOLIDS/TD Bottle	MISSING		-
UTB	<u>4</u> 0	GC/MS	TEMPERATURE when	checked Checked		1
	·		in.			
		-				
			•			
			· · · · · · · · · · · · · · · · · · ·			
Shut	tle Open	ed By: (pri	CHAIN OF CUS	TODY CHRONICLE Date	418 91	Time: 1647
i Sign	ature: <u>Fw</u>	بحلام	300moss.	Seal		Intact: V
l hav Nam		d these m	aterials in good condition	•		
Nam	e. ———			Signatu ———	ire: 	
Date			Time:	Remark		
l hav		d these m	aterials in good condition (from the above pers Signatu		7 4 4
Date			Time:	 Remark	 :s:	341
		d By: (prin		. Date		Time: 1 A S of
	ature:	nich	mike Zarenski	Sejal	71104110	Intact: 1450
,, –						

С	отрал	y: <u>C/0</u>	I NDUS]	RI-PLEX S	ITE	·	_ Attn.:	GOLDER ASS	OCIATE	ES, INC.
Fac	ility/Sit	e:		• • • • • • • • • • • • • • • • • • •			Phone	e; (617) 938	- 0530)
	-	INT		ON OF COM	MERCE WAY 8 BURN, MA	01801	_			
					SAMPLE IDEN	TIFICATIO	N			
Faci	lity:	<u> </u>	L D I	S R T			(Optional S	ample Point Descriptions)		
Sam	ple Poi		10 WI - 14		Š	6 4 1 6	<u>a</u> L	tert Time Elapsed (compo		
We	arce Code: II(W) I(S)	s: Outfall River/Strea		om Sediment (B) eration Point (G)	Treatment Facility	(T) L		ollection Sys (C) Oth		
		OTTLE			SHUTTLE CO	ONTENTS	T .	SAMPLER	T -	LAB
No	Туре	Size	Preserv.		ANALYSIS	•	Fill. (Y/N)	Observations	Ot	beervations
1	MET	1000	HNO3	METALS "	•		y	.45 micron		1
1	CUNS	125	H2S04	TOE/COD	•		Y	In line filte	1	- 1
1	CONS	1000	H2S04	NH3/TKN	•		У	used OED	1	
	CUNL	125	NUNE	SOLIDS/TO	, •		N	model FF820		
, and the second										*
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Size		SHUTTLE CONTEN	ITC	(L) spec	ify
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·	Preserv.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations	LAB Observations
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1		was opened			
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ttle Open	ed Bv: (pri	-41		410101	Time: (051
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e:		Time:	Remarks	s:	
ve receive ne:	ed these m	aterials in good condition from the a			:
e:		Time:	Remarks	s:	34
		MIDE COLENSIS!	Date:	71107116	Time: 1506 Intact: VES
	ve receive ne: e: ve receive ne: ttle Seale	ve received these mane: e: ve received these mane: et less the sealed By: (print)	CHAIN OF CUSTODY CHAIN	CHAIN OF CUSTODY CHRONICLE Intile Opened By: (print) In the Zarensk; Date: New received these materials in good condition from the above persone: Signature: Prime: Remarks Signature: Time: Remarks Time: Remarks Signature: Signature: Signature: Signature: Signature: Seal #	CHAIN OF CUSTODY CHRONICLE Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Opened By: (print) Intitle Sealed By: (print) Intitle Sealed By: (print) Intitle Opened By: (print) In

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	·	•	1140031	RI-FLEN SITE	-				INC.
	ility/Sit	INT		ON OF COMMERCE WAY	&	_ Phon	e: (617) 938	- 0530	
	Addres	s: <u>All</u>	ANTIC A	VENUE, WOBURN, MA	01801	-			
		_		SAMPLE IDE	NTIFICATIO	N			
aci	iity:	<u> </u>	I L D II	S R T		(Optional S	sample Point Descriptions)		
am	ple Po	int: Wh	10141-19	118 [11 21 21 21 21 21 21 21 21 21 21 21 21	1041116		21310/1		
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We	irce Code II(W)	Outfall		om Sediment (B) Surface Impoun	• •		ollection Sys(C) Oth		(X)
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		ature:		Tuph U. Waw		Seal		Intact: YE	<u> </u>
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2.	Date			Time:		Remarks			
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_	Name		.u iiicə t iii	erengia in Soon condition in		Signatur		7 4 5	,
3.	Date			Time:	f	Remarks	3: :	- 54/	
	<u> </u>		d By: (prin	*\		Date:		Time: 14	
	\		y. (p.:	DIEMEN A. WHEE	356	/ Seaj	TITUATIO	Intact: Ye	15

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C	ompar	ıy: <u> C ∕ 0</u>	INDUST	RI-PLEX SITE		Attn.:	GOLDER ASS	OCIAT	ES, INC.
-ac	ility/\$i	te:	FRSECTI	ON OF COMMERCE	WAY R	_ Phon	e: (617) 938 -	- 0530	0
	Addres			NUENUE, WOBURN,					
				SAMP	LE IDENTIFICATIO	NC			
aci	lity:	<u> 61 0</u>	Facility/Si	SIRITI I		(Optional S	ample Point Descriptions)		
am	ple Po	int: W-	<u> 0 W - </u>	15 10 IA 1 1	91 0141 A	ينا له	520 Line Elapsed H	lours	
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	IF(W) I(\$)	Outfall River/Strea					llection Sys(C) Othe		
		BOTTLE		SHI	UTTLE CONTENTS	1	SAMOLEO	7	
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1	CUNS	125	H2504	TOC/COD /		7	moran-filter used	1	
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				100 C 100 C				1	
	<u> </u>				F CUSTODY CHRO				
1.	l.	tle Openi ature:	ed By: (pri	OIENHEN	A. WHERE	Date: Seal #	710719	Time: Intact:	1349
			ed these m	aterials in good cond	dition from the abo			- Intact.	YES
2.	Nam					Signatur			
	Date	:		Time:		Remarks	:		
	l hav	e receive	d these m	aterials in good cond					
3.	Nam	e: 		·		Signatur	e: 		349
	Date			Time:		Remarks			
4.			d By: (prin	VIEWEN A	1. WHEELDR	Date:	71104116	Time:	1605
	Signa	ature:	_ D y	De Colvage	_1	_ Spalf	189314	Intact:	YES

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C	ompar	ıy: <u> </u>	INDUST	RI-PLEX SITE	— ·		: GOLDER AS		
Fac	ility/Si	te:	ERSECT	ON OF COMMERCE WAY (<u> </u>	_ Phon	e: <u>(617) 9/8</u>	<u>- リラブ</u>	ΰ
	Addres			VENUE, WOBURN, MA	<u>01801</u>	. <u>.</u>	-		
				SAMPLE IDEN	TIFICATIO	N		· <u></u>	
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50	il(S)	River/Strea	ım(H) Gen	eration Point(G) Treatment Facility SHUTTLE C		ake/Ocear	(L) Sp	lecity	
	i	OTTLE		ANALVEIC			SAMPLER		LAB
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_1	CONS	1000	H2S04	NH3/TKN /	<u></u> ,	Y	USED	V	
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			6 ₂			11015			
	Shut	tle Open	ed By: (pri	CHAIN OF CUSTO		Date:	20 04 05	Time:	1335
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	I hav	e receive		aterials in good condition fro					<u></u>
2.	Nam	e: <u>M</u> Դ	seza	rensKi'		Signatu	re: Michael	Zam	٠ لكم
	Date	4117	191	Time: 12 0 0	`	Remark	s:		
	1	I have received these materials in good condition from the							
3.	Nam	Name:					re: 		35
	Date			Time:	F	Remark:			
4.	i		d By: (prin	MINE GALENSON		Date:	7111191	Time:	125
	Signa	ature: 🔨	Michae C	2 oranila.		_ Seel	#: <u>189346</u>	_ Intact:	<u>_</u>

										
С	ompan	y: <u> </u>) INDUST	RI-PLEX SITE		Attn	GULDER AS	SUCTATE	ES, INC	
Fac	ility/Sit	e:				. Phon	e: (617) 938	<u>-</u> 853(3	
	•	INT		ON OF COMMERCE WAY & VENUE, WOBURN, MA	01801_					
	Addies	. <u> </u>	nivic r	TVEHOLT WOBOKKS, THE	01001	-				
			· · · · · · · · · · · · · · · · · · ·	SAMPLE IDENT	IFICATIO	N			 -	
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Soi	(, , (S)	River/Strea	m(R) Gen	eration Point (G) Treatment Facility SHUTTLE CO		ike/Ocean	(L) Sp	ecify		
		BOTTLE	¥	ANALYSIS		-	SAMPLER		LAB	
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1	MET	1000	HNU3	METALS .		У	USED . 45 MILTON	, /	-	
1	CUN S	125	H2504	TOC/COD		У	FIELD FILTER	V	<u> </u>	
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_1	CUNU	125	NUNE	SOLIDS/TD •		<u> </u>		-		
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		+5	- 30	CHAIN OF CUSTO	OV CHRO	MICL F	1			
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	l hav	e receive	d these m	aterials in good condition from						
3.	Nam	e: 			s	ignatu	re:		353	
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	Shut	tie Seale	d By: (prin	t) n. 140 n. 14		Date	4/17/01	Time:	toss	
4.	1	ature: N	· ''	mille zarensk	<u> </u>	Sepal	#:, 189344	Intact:	<u> </u>	

<u></u>	~!/Y	<i>∪r</i>	<u> </u>	FORM (CC1)	Date Se	=aiea	91/04/05	By:	ma		
	omnar	w: 626	LINDIG	RI-PLEX SITE		Atto	: GOLDER ASS	SUCIATE	4/19		
			TIABRID I	KI-FLEA SIIL							
Fac	ility/Si	te: INT	ERSECTI	ON OF COMMERCE WAY	&	_ Phon	e: <u>(617) 938</u>	<u>- 0530</u>			
i	Addres	s: <u>Ail</u>	ANTIC F	NVENUE, WOBURN, MA	01801						
•				SAMPLE IDE	NTIFICATIO						
-aci	lity:	<u>당] 0</u>	Facility/Si	S R T -=	- pti	(Optional	Sample Point Descriptions	p, Kp			
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We	rce Code II(W) I(S)	Outfall River/Strea		om Sediment (B) Surface Impour eration Point (G) Treatment Faci	ity(T) L	_ake/Ocean	ollection Sys (C) Ot				
		BOTTLE		SHUTTLE	CONTENTS		SAMPLER	1	LAB		
No	Туре	Size	Preserv.	ANALYSIS	.	Fill. (Y/N)		Ot	servation		
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1	CUNS	125	H2S04	TOC/COD -		У	filter	N	<u>.</u>		
1	CONS	1000	H2504	NH3/TKN *		y	VS & C	V	\$		
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	010	40	GC/113		erre						
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				and the second							
	Shut	tle Open	ed By: (pri	CHAIN OF CUST	ODY CHRO	NICLE Date:		Time:			
1.	1	ature: 🕝		THINK E GLENCH		Seal f	<u>418141</u>	Intact:	$\frac{1}{1}$		
				aterials in good condition f	rom the abo	-					
2.	}	I have received these materials in good condition from Name:					Signature:				
	Date			Time:		Remark					
3.	I hav Nam		d these m	aterials in good condition f		ove pers Signatu					
	Date			Time:		Remark	s: <i>:</i>		35		
4.			d By: (prin	1) melas 2 ares	nski	Date:	4111151	Time:	10:		
	Sign	ature: <u>N</u>	whan	2 } au 2,		_ Seal	#:/ 189344	Intact:	<u> </u>		

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С	ompan	iy: <u>C/U</u>	INDUST	RI-PLEX SITE		Attn.:	GOLDER ASS	SUCTATE	.S, INC.
ac	ility/Sit	te:	EDSECTI	ON OF COMMERCE WAY &		Phon	e: <u>(617) 938</u>	<u>- 0530</u>	<u> </u>
	Addres				1801				
	·			SAMPLE IDENTI	FICATION				
aci	lity:	<u> </u>	Facility/Si	SIRITI MAY.	x Sp.K	Optional S	Duple (4)	τ	
am	ple Po	int: X- Source Cod	de Yo		1 Date 1 M/DD1	s	tart Time Etapsed to hr. clock)		
We	urce Code II(W) I(S)	os: Outfall River/Strea		om Sediment(B) Surface Impoundmer eration Point(G) Treatment Facility	• •				· · · · · · · · · · · · · · · · · · ·
				SHUTTLE COI	YTENTS				
No	Type	Size	Preserv.	ANALYSIS	FI	II. (Y/N)	SAMPLER Observations	Ot	LAB
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1	CONS	1000	H2S04	NH3/TKN /		У		~	*
1	CUNU	125	NUNE	SOLIDS/TD /		N			
:						· · · · ·		<u> </u>	
								<u> </u>	
						 =			
								 	
				OUANI OF CUSTOR	Y CUPON	CLE		<u> </u>	
	Shutt	lle Open	ed By: (pri	CHAIN OF CUSTOD		Date:	910409	Time:	1235
1.	Signa	ature:		STEPHEN A. WHEE		Seal #	0186.345	Intact:	1335 Yes
	I have	e receive	d these m	aterials in good condition from					
2.	Name	B:	KY Z	arenski'	Sig 	gnatur	e: Nuchail	2 m	evali.
	Date	4 117	ılaı_	Time: \\&&	Re	marks):	<u> </u>	
	I have		d these m	aterials in good condition from		perse			
3.			·- -						357
	Date:		d D.:: /=-!-	Time:		marks Date:	4) (-	Time:	1
4.	Ī	ile Seale ature: /\	d By: (prin	"Mike Zarensk.		Seal (4/12/91	Time: Intact:	1520
	7.9.16		-exa	'A A SURGERS			x 91 -	94	

С	ompan	ıy: <u>C∕C</u>	INDUST	RI-PLEX SITE	Attn.	: GOLDER ASS	SOCIATES, INC
	•	•				e: <u>(617)</u> 938	
	ility/Sit	INT		ON OF COMMERCE WAY &	Pnon	le:	- 0770
	Addres	s: <u>ATL</u>	ANTIC F	VENUE, WOBURN, MA	01801		
				SAMPLE IDENT	IFICATION		
aci	ility:	<u>당</u> 0	I L DI II Facility/Si	S R TI	(Optional	Sample Point Descriptions	
Sam	iple Po	int: W- Source Co (from belo		iur Sample Point ID St		41/15 Start Time Elapsed (compo	· · · · · ·
We	urce Code elf(W)	is: Outfall River/Strea		om Sediment (B) Surface Impoundme		ollection Sys(C) Oth	
30	il(\$)	HIA6020.69	im(A) Gen	eration Point (G) Treatment Facility SHUTTLE CO		(L) Spe	ectry
	1	BOTTLE		ANALVOIC		SAMPLER	LAB
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1	MET	1000	HNU3	METALS /	У	45 MKRON .	V
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1	CONS	1000	H2S04	NH3/TKN 🗸	у_		1 +
1	CUNU	125	NUNE	SOLIDS/TD /	N		/
			<u></u>				
	Shut	lle Onen	ed By: (pri	CHAIN OF CUSTOR	Doto	910409	Time: 1054
1.	1	ature:	انت	DIEMEN A. WHERLY	<u> </u>	910409 126 1980	Intact: 1054
_	I hav	e receive		aterials in good condition from			1
2.	Name	e: _ <i>DA</i>	W/D	S. LEY	Signatu	re: Al Hus	Engles
	Date		/21	Time: /4/5	Remark	s:	1
	1		d these m	aterials in good condition from			<u> </u>
3.	Nam	e: ——			Signatu ——		359
	Date			Time:	Remark		
4.			d By: (pr) a	DAVID S, LEY	Date:		Time: 153
	Signa	ature:		bakus hel	Şeal	#5 <u>/8734-2</u>	Intact: VES

С	ompar	1y: <u>C/C</u>	INDUST	RI-PLEX SITE	Attn.	: GOLDER AS	BUCIATES, INC
Fac	ility/Si	te:		ON OF COMMERCE WAY &	Phor	e: (617) 938	- 0530
	Addres	SS: ATL	ANTIC A	ON OF COMMERCE WAY & WENUE, WOBURN, MA	01801		
				SAMPLE IDENT	IFICATION		
Faci	ility:	ြေ	L D I	S R T	(Optional	Sample Point Descriptions)	
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		BOTTLE	····	SHUTTLE CO	NTENTS	CAMPLED	
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1	MET	1000	HNU3	METALS *	У	· 45 MICRON	
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		: 1		CHAIN OF CUSTO	Y CHRONICLE	<u> </u>	
1.	Į.	atura: .	ed By: (pri	MINY LAFENSKI	Date:	<u> +19191 </u>	Time: 1 of c
			d these m	aterials in good condition from			<u> </u>
2.	Nam				Signatu ——		
	Date	:		Time:	Remark	s:	
	I hav Nam		d these m	aterials in good condition from	n the above pers Signatu		
3.	Date		·····	Time:	—— Remark	s: <u>-</u>	361
	Shut	tie Seale	d By: (prin	1) MIKE ZMENSKI	Date	91/64/17	Time: 17\$5
4.	Sign	ature: 🎮	uelo.	70.00	Şeal	#: 18935Z	Intact: YES

4...I T.

			intal Testing cation Corp. ISTODY	FORM (CC1)	RIGINAL Date Se	ealed	91/04/U5 E	ly:
		C /C	: INDUST	DI DIEV CITE			COLOGO ACO	nciates we
С	ompan	y:	110021	RI-PLEX SITE			GULDER ASS	
Fac	ility/Sit	е:	FPRECTI	ON OF COMMERCE	USV R	_ Phone	e: <u>(617) 938</u>	<u>- 0530</u>
i	Addres	s: ATL	ANTIC A	NVENUE, WOBURN,	MA 01801			
					LE IDENTIFICATIO	ON		
aci	lity:	ن اف	Facility/Si	S R T	DUPLICA	(Optional S	ample Point Descriptions	
Sam	ple Po	int: Kj- Source Cod (from below	ie Yo	41910141F1 1 our Sample Point ID steft justify)	911 014 117 Start Date (YY/MM/DD)	s	61310 Lapsed h	
We	rce Code II(W) I(S)	Outfall		om Sediment(B) Surface eration Point(G) Treatm			ellection Sys(C) Oth	
			-	SHU	TTLE CONTENTS			
No	Туре	Size	Preserv.	ANALY	/SIS	Filt. (Y/N)	SAMPLER Observations	LAB Observations
	mET	1000	HNO3	METALS *		Y	·45 micron	V
1	CUNS	125	H2S04	10C/COD •		Y	7 n me	7
1	CONS	1000	H2S04	NH3∕TKN ●		Y	fulter	V *
1	СПИП	125	NUNE	SOLIDS/TD .		N	used	/
1	итв	40	GC/MS	TEMPERATURE •	•			
						<u> </u>		<u> </u>
	Shutt	le Open	ed By: (pri	-41	CUSTODY CHRO	Date:		Time: 105
1.		iture: "	•	WIDA COLS		Seal #	714141	Intact: V
	1 -	<u>_</u> _	d these m	2 2 mones aterials in good cond				
2.	Name		~ mese III	atorialo ili godd colld		Signatur		
	Date:			Time:		Remarks	3:	
_	I have		d these m	aterials in good cond		ove perso Signatur		
3.	Date:			Time:		Remarks	s: <u></u>	363
·	Shutt	le Seale	d By: (prin	I) MIKE ZAZE	ACN I	Date:	21/44/17	Time: 170
4.	Signa	iture:	يجانعه	Q Zanen	1	Şeal #	187352	Intact: Yes
	1			1 1 1				بالتباكات أروي والمراوي

		ental Testing lication Corp. JSTOD	/ FORM (CC1)	BINAL		93/9 ETC Jo 1/04/05 E		
acility/S	Site: I N 7	TERSECT	TRI-PLEX SITE TON OF COMMERCE WAVENUE, WOBURN, M	A YAL		GOLDER ASS (617) 938		
			SAMPLE	IDENTIFICATION	J		·	
Source Co	Source Co (from belo	J₩)	our Sample Point ID (left justify)	Start Date (YY/MM/DD)	Ste (2400	Time Elapsed I	sit e)	
oil (S	-		neration Point(G) Treatmen	t Facility (T) La		ction Sys(C) Oth		
	BOTTLE		SHUT	TLE CONTENTS		SAMPLER	1	LAB
• Туре		Preserv.	ANALYS	is i	Filt. (Y/N)	Observations	/Ot	LAB servations
1 MET	1 0ug	нио3	TOTAL METALS	•	7		V	
	Y .							
			CHAIN OF C	USTODY CHRON			7:	
1. Sig	inature: _Y	اea By: (bu	nt) Mike Zarenek	· · · · · · · · · · · · · · · · · · ·	Date: Seal #:	418191	Time: Intact:	647 Y
l há			aterials in good conditi		e persoi gnature			
Dat	te:	<u>.</u>	Time:	R	emarks:			
I ha Nai		ed these m	aterials in good conditi		e persor gnature		r .	365
Dat	e:		Time:	R	emarks:			
4.		ed By: (prin	1) mkeZaren	s Ki	Date:	91/04/16	Time:	1450
	nature: ONLY Open		Jan VOD) Date: 4//	Seal #:	189 320Time:	Intact:	VES OCL
HUTTLE			TEMP. °C	SEAL#	893	20 cond	12	45

			ental Testing ication Corp.	FORM (CC1)		ク <u>3/ク</u> ETC。 91/04/05	Job# <u>CA6464</u> By: <u>พพ</u>
Faci	lity/Si	te:	ERSECTI	ON OF COMMERCE WAY &	Phone	GOLDER AS	
Sou /el	Pie Po	int: W- Source Co (from belo	w) (O) Boti	SIT	(Optional State Colors) (Optional State Colors)	9 hr. clack) (comp	ther
-				SHUTTLE CO			
		BOTTLE		ANALYSIS		SAMPLER	LAB
1	MET	1000	HNO3	TOTAL METALS .	Fill (YIN)	Observations	Observations
•							
		e de la companya de l		·			
	1			CHAIN OF CUSTO	DY CHRONICLE		
1.	Sign	ature: 🔨	ed By: (pri سکارمی	Sovenon 5	Seal #:		Time: 1051 Intact:
J.	I hav Nam		d these m	aterials in good condition fro	m the above perso Signature		
	Date			Time:	Remarks		
Š .	i hav Nam		d these m	aterials in good condition from	m the above perso Signature		
-	Date			Time:	Remarks	*	367
4.	Sign	ature: <u>M</u>	d By: (prin	0,3 grans Sg'	Seal #	91/04/16 169.318	Time: 1500
	USE OI	NLY Open			SEAL # 1893	Time:	Intact

CH.	AIN	OF CL		FORM (CC1) ORIGINAL	ate Sealed	91/04/05	By: <u>ա</u> ա		
C	ompai		INDUST	RI-PLEX SITE	Attn.:	_ GOLDER AS	SUCIATES, INC.		
Faci	lity/Si	te:			Phone	e: <u>(617) </u>	- 0530		
	-	INT		ON OF COMMERCE WAY & OLD ON OF COMMERCE WAY &					
	 			SAMPLE IDENTIFIC	CATION				
acil	ity:	<u> 61 0</u>	L D I	S R T I	(Optional S	ample Point Descriptions)			
am	ple Po	oint: W- Source Co (from belo		our Sample Point ID (left justify) Start Dail (YY/MM/D	ie S	SIRISI Elapsed the clocki (comp			
Wel	rce Code I(W) (S)	outfall River/Stres	• •	eration Point(G) Treatment Facility	.(T) Lake/Ocean		her		
		BOTTLE		SHUTTLE CONT	ENIS	SAMPLER	LAB		
No	Type	Size	Preserv.	ANALYSIS	Firt. (Y/N)	Observations	Observations		
1	MET	1000	HNO3	TOTAL METALS	N		V		
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\dashv						<u> </u>			
	•								
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				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					
	Shut	tle Open	ed By: (pri	CHAIN OF CUSTODY O	CHRONICLE Date:	Q1040C	Time: \349		
1.	l .	ature:		TOPERHEN A WHERE	<u></u> _	910409 :0189313	Intact: YES		
2.	I hav Nam		d these m	aterials in good condition from th	•	on.			
=="	Date	:		Time:	– Remarks	Remarks:			
3.	i hav Nam		d these m	aterials in good condition from th	e above perso Signatur				
	Date	:		Time:	Remarks	3: <u> </u>	369		
4.	Shut	tle Seale	d By: (prin	TIDHEN A. WHERE	Date:	91/04/16	Time: 1605		
→.	Sign	ature:		Tup O. WRUL	Seal #	189 314	Intact: YES		

		r/f	1 ikmiei	RI-PLEX SITE	- سفد ه	GOLDER ASS	OCIATES, INC
C	ompar	ıy: <u> </u>	- INCUS	-			
Faci	ility/Si	te:	ERSECT	ON OF COMMERCE WAY &	Phone	: <u>(617)</u> 938	- 0530
	Addres			NVENUE, WOBURN, MA 018	01		
				SAMPLE IDENTIFIC	ATION		
Faci	lity:	<u> </u>)」」DI II Fachity/Si	SIRITI I	(Optional S	ample Point Descriptions	
Sam	ple Po	Source Co		Dur Sample Point ID (left justify) 9 1/ 0 4 Start Date (YY/MM/DD	s s	ololol Elapsed Ohriclock) (compo	
We	irce Cod∈ { (W) (S)	os: Outfall River/Strea		om Sediment(8) Surface Impoundment			
			, ,	SHUTTLE CONTE			· · · · · · · · · · · · · · · · · · ·
	1	BOTTLE		ALLAL VOIC		SAMPLER	LAB
No	Type	Size	Preserv.	ANALYSIS	Flit. (Y/N)	Observations	Observations
1	MET	1000	Ниоз	TOTAL METALS	N		/
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			المتعدد و				
		•		CHAIN OF CUSTODY C			
1	ì		ed By: (pri	WILL MALENZU	Date:	418A1	Time:
7.			nehous		Seal #		Intact:
2.	I hav Nam		ed these m	aterials in good condition from the	above perso Signatur		•
€.	Date	:		Time:	- Remarks -		
	1		ed these m	aterials in good condition from the			<u></u>
3.	Nam	e: ——			Signatur -		
	Date			Time:	Remarks	:	37
4.		tle Seale ature: /	ed By: (prin	" mikp z arenski	Date:	4 117 191	Intact: $\int \frac{\sqrt{5}}{\sqrt{5}}$
	J.g.i	#.u.e	M.A.	my gennight	4/18		455

C	ompar	ny: <u>Cz1</u>	INQUS	TRI-PLEX SITE	Attn.:	GOLDER ASS	BOCIATES, INC.
Faci	ility/Si	te:			Phone	<u>(617) 938</u>	- Ub30
	-	INT		ON OF COMMERCE WAY &		,, <u> </u>	
	Addres	SS: <u>HIL</u>	HNIIC F	AVENUE, WOBURN, MA 0	1801		
				SAMPLE IDENTI		·····	
Faci	lity:	<u> </u>	DE DE I	SIRITI MA	· + · · · · · · · · · · · · · · · · · ·	ample Point Descriptions	
Sam	ple Po	Source Co	ode Y		Date Si	art Time Elapsed	
We	irce Code II . (W) I (S)	Outfall River/Strea		eration Point(G) Treatment Facility		llection Sys(C) Oth	ner
		BOTTLE		SHUTTLE CON	ITENTS	SAMPLER	LAB
No	Туре	Size	Preserv.	ANALYSIS	Fill. (Y/N)	Observations	Observations
1	тзп	1000	HNUJŠ	TOTAL METALS .	N		1
		¥0.30	111135	1 C 11176m 5 1 bis 1 1 1 the C			
							
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			See	CHAIN OF CUSTOD	/ CHRONICLE		
4	Shut	tle Open	ed By: (pri		1 0-4	4 18 191	Time: 7 7
1,			nicha	2 Zarensai	Seal #	189343	Intact:
	l hav Nam		ed these m	aterials in good condition from	the above personal Signature		
2.	112111	·					
	Date	:		Time:	Remarks	·	
	1	,	ed these m	aterials in good condition from	the above personal Signature		
3.	Nam	e. ——			— Signatur	·	770
	Date	•		Time:	Remarks	:	372
4.	Shut	tle Seale	ed By: (prin	"M.K. Zarras	K, Date:	4 17 121	Time: 1955
₩.	Signa	ature: 🔨	waa	O Tonewales	Seal #	189344	Intact:

c	ompai	nv: _ C/0	INDUST	RI-PLEX SITE	Δttn.:	GULDER ASS	OCIATES, IN
	•	•				(617) 938	——————————————————————————————————————
	ility/Si	111		ON OF COMMERCE WAY &		(81)) ///	<u> </u>
•	Addre	ss: <u>Ail</u>	ANTIC A	NUENUE, WOBURN, MA 018	301		
				SAMPLE IDENTIFIC	CATION		
Faci	lity:	<u> </u>	Facility/Si	S R T L	(Optional Sa	mple Point Descriptions;	
Sam	ple Po	int: W- Source Co (from belo		4 5 9 1 4 4 ur Sample Point ID Start Dai tleft justify) (YY/MM/D	te Sta	trt Time Elapsed (compo	
	urce Codi III(W)	es: Outfall	(O) Bott	om Sediment (B) Surface Impoundment	(I) Leachate Coll	ection Sys(C) Oth	ner
Soi	il(S)	River/Strea	ım(R) Gen	eration Point(G) Treatment Facility		,,,,,(L) Spe	scify
	-	BOTTLE		SHUTTLE CONT	EIRIO	SAMPLER	LAB
No	Туре	Size	Preserv.	ANALYSIS	Fill (Y/N)	Observations	Observation
1	MET	1000	НNЮЗ	TOTAL METALS V	N		/
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		<u> </u>					1
\dashv							
							
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		·					
\neg	-			V			
				CHAIN OF CUSTODY	CHRONICLE		<u> </u>
1.	1		ed By: (pri		Date:	910409	Time: 1054
··		ature:		Span Whomen		0189341	Intact: YES
	l hav	е.		aterials in good condition from th	e above perso Signature	A 1 1	. D . Le
2.	1 .		AVID S		_	AFD.	the first
	Date		/21	Time:/425	Remarks:		
3.	I hav Nam		ed these m	aterials in good condition from th	e above perso Signature —		
	Date	:		Time:	Remarks:	<i>:</i>	37
	Shut	tle Seale	d By: (prin	DAVID S. LEY	Date:	4/17/91	Time: [5
4.	Sign	ature: 🔏	IX Z	- 601	Seal #	1893+2	Intact: 1/65

C	ompan	y: <u>C/</u> 0	INDUS	TRI-PLEX SIT	E	Attn.:	GOLDER AS	SUCIATES, IN
	•	-			_		(617) 938	
raci	Addres	s: ATL	ERSECT ANTIC A	TON OF COMMET AVENUE, WOBUI	RCE WAY & RN, MA 0	1801 Phone		
_				SA	MPLE IDENTI			
Facil	lity:	ا ا	Facility S	SIRITI	Du	PLICATE (Optional 5	ample Point Descriptions)	
		nt: X - Source Co (from belo	-0 IM -1	40 0 U P our Sample Point ID (left justify)	9 / 100 Start	Date S	613101 L lart Time Elapsed 0 hr. cłocki (compe	
Wel	rce Code i(W) (S)	s: Outfall River/Strea			Surface Impoundment Treatment Facility		(lection Sys (C) Oth	
					SHUTTLE CON	ITENTS		
No		OTTLE	Preserv.	A	NALYSIS	Filt. (Y/N)	SAMPLER Observations	LAB) Observation
	Туре			TOTAL METAL			OD34148(10118	Coservatio
-	MET	1000	HNU3	TOTAL METAL	_5 •	- N	,,,,	
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							·-····································	
	Shutt	lo Open	ad By: (pri	CHAIN	OF CUSTOD	CHRONICLE Date:	1	Time: Ide
1.	Signa	iture: w	wales	nt) Mike Zo	zrensbi	Seal #	419191 : 189351	Intact: VS
				naterials in good	condition from			<u> </u>
2.	Name			_		Signatur		
_,	Date:			Time:		Remarks		
	I have	receive	ed these m	aterials in good o	ondition from	the above perso	on.	
3.	Name): 				Signatur 	e:	
•	Date:			Time:		Remarks	i:	3.
	Shutt	le Seale	d By: (prir	II) MIKE ZA	Ken Ski	Date:	91/04/17	Time: 7 ø
4.	Signa	ture: O	متحلام ا	2000	~ ~~~~~	Séal #	D187352	Intact: YES



	ETC JOB#
	to the same of the
•	Sample Point Source Code Sample Point LD.
de (= FIELD PR	OCEDURES 0W-22 Ma 4/25/4/
, β496, ···	
PURGE DATE START PURGE ELAPS	ED HRS WATER VOL. IN CASING VOLUME PURGED
[(YY MM DD) (2400 Hr Clock)	(Gallons) (Gallons)
SAMPLING METHOD:	
Sampler Type E B-ISCO E-Baller	
Sampler Type	X-Other
A-Teflon C-PVC	
Sampler Material D B-Metal D-Plastic	X-Other
Tubing Material A-Teffon C-Polyethyle B-Tygon D-Silicon	X-Other
1 ((SPECIFY OTHER)
Sample Composited YM	
	Procedura/Proportions
1 1 1 1 1	SUREMENTS
Well Elevation (ft/msl)	Well Depth (ft) 16164
Depth to Ground water (ft)	Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)	
	10sy in 2
Values Are Con	KEOT
	plem EH 166 MV
	EH 166 mV
	(other parameter) value units
ph ppec. cond.	(other parameter) value units
ph spec. cond.	(Other parameter) volue units
Sample Temp Turbidity	
	DMMENTS
Sample Appearance: Slightly Turbid	70000
Weather Conditions: Cloudy, 45°F S	ght wind
Other:	163 gal 1+ 2"CASING
P.15eVol = (16.64-9.0)	163)(3) = 4.0
well purged dry @ 5	.c gallons,
•	eto broken bottles
FILTERING: Use Chain of Custody (CC1) to in	dicate which bottles were filtered
Sampler: M. Hr Zarensk,	Employer: Golder Assoc.
I certify that sampling procedures were in accordance	with applicable EPA state and corporate protocols.
(Date) (Signature)	378



	ETC JOB# (A6448 CA 6673
_	Sample Point W DW-15101A1 1 Source Code & Sample Point I.D.
-	FIELD PROCEDURES #4/55/4/
	PURGE DATE START PURGE CLAPSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
#	SAMPLING METHOD:
 	Sampler Type X A-Submersible Pump D-Dipper/Bottle E-Baller F-Scoop/Shovel X-Other Water
	Sampler Material A-Teflon B-Metal C-PVC D-Plastic X-Other C-PVC D-Plastic X-Other
#	Tubing Material C A-Teflon B-Tygon C-Polyethylene D-Silicon X-Other R-Technology OTHER)
ł	Sample Composited Y/
-	Procedure/Proportions
	FIELD MEASUREMENTS
	Well Elevation (ft/msl) → Well Depth (ft) 30.76
7	Depth to Ground water (ft) Sample Depth (non-well) (ft)
İ	Groundwater Elevation (ft ms!)
44	·
T	
 	1st 5 . 8 4 (STD) 1st 12 Ø at 25°C EL units
7	2nd 5 86 (STD) 2nd 2 2 6 6 uniform Eh 151 my
**	3rd (STD) 3rd um/cm at 25°C (other parameter) value units
	4th sph (STD) 4th um/cm at 25°C (other parameter) value units
7_	Sample Temp Turbidity
 لاق	FIELD COMMENTS
T	Sample Appearance: Ytllowish I no odor
l	Weather Conditions: Partly Sunny, 45° F Slight breeze
-	Other:
	Pirge Volume = (30.26-12.87) (.652(3) = 34
•	well not surveyed information not available
4	652 gallf+ 4"casion
_ 	FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
	Sampler: M.K. Zarenskí Employer: Golder Assoc.
4	I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
ارم	4 Me 100 Taren 380



ETC JOB # <u>CA 6420</u>
Sample Point W ONIA 1 1 1 1 1 1 1 1 1
FIELD PROCEDURES
PURGE DATE START PURGE (CARD HIR CHOCK) PURGE DATE (YY MM DD) PURGE DATE (2400 HI CHOCK) PURGE DATE (Gallons) PURGE DATE (Gallons) PURGE (Gallons)
SAMPLING METHOD:
Sampler Type E A-Submersible Pump D-Dipper/Bottle B-ISCO
Sampler Material A A-Teflon C-PVC T-Plastic X-Other (SPECIFY OTHER)
Tubing Material A-Teflon C-Polyethylene D-Sillcon X-Other
Sample Composited (N)
FIELD MEASUREMENTS
Well Elevation (ft/msl) Depth to Ground water (ft) Groundwater Elevation (ft msl) Well Depth (ft) Sample Depth (non-well) (ft) [10554] Sample Depth (non-well) (ft) [10554] [10554] [10554] [10554] [105554]
1st 6 c 45 (STD) 1st 1980 um/cm EH 1306 mV um/ts
2nd O e 4 4 (STD) 2nd Q 80 at 25°C EH 3 0 4 www.
3rd
4th spec. cond. at 25°C (Other parameter) value units
Semple Temp Turbidity
FIELD COMMENTS
Sample Appearance: CLEAR SOME REDDICH BROWN MATTER
Weather Conditions: SWHY SLIGHT BREEZE ~50°F
Other:
PARGE CALC: DEPTH OF WELL - DEPTH TO WATER X . W52 (G21/F1 of 4" C25mg) x 3 =
48.50-7.06 = 41.44 x 652 x 3 = 8x C/c
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: Stephen A. WHEFTER Employer: GOLDER ASSOCIAC
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
91/04/12 Steph a. Wheile 314



ETC JOB# C A 642/	
Sample Point W WILLILL	
, Source Code Sample Point I.D.	
FIELD PROCEDURES	
9 1 1 0 1 4 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
(YY MM DD) (Z400 Hr Clock) (Gallons) (Gallons)	
SAMPLING METHOD:	-
Sampler Type E B-ISCO E-Bailer X-Other	
C-Bladder Pump F-Scoop/Shovel (SPECIFY OTHER)	
Sampler Material A B-Metal D-Plastic X-Other SPECIFY OTHER)	-
Tubing Material NA A-Tellon C-Polyethylene X-Other SPECIFY OTHER	_
Sample Composited Y/N	
Procedure/Proportions	_
FIELD MEASUREMENTS	
Well Elevation (ft/msl) 15 7 18 6 Well Depth (ft) 12 6 13 2	
Depth to Ground water (ft) 6.18 Sample Depth (non-well) (ft)	
Groundwater Elevation (ft msl) 51168	i
1st 6 - 7 5 (STD) 1st 1850 uni/cm EH -3 6 m	į
2nd 6 - 7 (STD) 2nd 7850 um/cm EH - 371 my	
3rd (STD) 3rd um/cm at 25°C (other parameter) value units	
4th (STD) 4th um/cm at 25°C	
ph spec, cond. (other parameter) value units	ļ
Sample Temp Turbidity	
FIELD COMMENTS	ļ
Sample Appearance: Brownish color Trong Oder Weather Conditions: 5 - 1 1 050 F 10 mph winds	-
0 11 3 2 3 4	-
Other: Purse Vol = (26.37 -6.18) (.657)(3)	_
DWIT is 4" diameter PVC well Purged using dedicated	_
I' Brady Valve on the end of Poly ethylene Tubing	
To finish sampling 6 1230	
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered	
Sampler: Mike Zarenski Employer: Gulder	_
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.	ļ
4/11/91 michael Zonesa	



Sample Point Source Code Sample Point LD. FIELD PROCEDURES FIELD PROCEDURES FIELD PROCEDURES SAMPLING METHOD: Sampler Type E A-Submersible Pump B-ISCO C-Bladder Pump C-Bladder Pump B-ISCO C-Bladder Pump B-Metal A-Teflon B-Metal A-Teflon B-Metal A-Teflon B-Typon A-Teflon B-Typon C-PVC D-Plastic C-POlyethylene D-Sillicon C-Polyethylene D-Sillicon C-Polyethylene D-Sillicon X-Other (SPECIFY OTHER)
Sample Point Source Code Sample Point I.D. FIELD PROCEDURES FUNGE DATE (TY MM DD) SAMPLING METHOD: Sampler Type E A-Submersible Pump B-ISCO C-Bladder Pump B-Scoop/Shovel Sampler Material A-Tetion B-Metal A-Tetion C-PVC D-Plastic Tubing Material A-Tetion C-PVC D-Plastic C-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D-PVC D
Source Code Sample Point I.D. FIELD PROCEDURES FUNCE DATE (TY MM DD) START PURGE (2400 Hr Clock) SAMPLING METHOD: Sampler Type E A-Submersible Pump B-ISCO C-Bladder Pump C-Bladder Pump Sampler Material A-Teflon B-Metal A-Teflon B-Metal C-POlyethylene C-Pollyethylene
SAMPLING METHOD: Sampler Type E A-Submersible Pump B-ISCO C-Bladder Pump F-Scoop/Shovel Sampler Material A-Teflon B-Metal B-Metal C-POlyethylene C-Polyethylene
SAMPLING METHOD: Sampler Type E B-ISCO C-Bladder Pump Sampler Material A-Tetion B-Metal C-PVC D-Plastic C-Polyethylene
SAMPLING METHOD: Sampler Type E B-ISCO C-Bladder Pump F-Scoop/Shovel Sampler Material A-Tetlon B-Metal A-Tetlon C-PVC D-Plastic C-Polyethylene
Sampler Type B-ISCO C-Bladder Pump F-Scoop/Shovel Sampler Material A-Teflon B-Metal C-PVC D-Plastic X-Other (SPECIFY OTHER) Tubing Material A-Teflon C-PVC D-Plastic X-Other SPECIFY OTHER) X-Other SPECIFY OTHER)
Sampler Material 8-Metal D-Plastic X-Other 68PECIFY OTHER) Tubing Material 8-Metal C-Pollyethylene X-Other X-Other
I libing Material 1 to 1 to 2 to 2 to 2 to 2 to 2 to 2 to
B-Tygon D-Silicon X-Other (SPECIFY OTHER)
Sample Composited YDD
Procedure/Proportions
FIELD MEASUREMENTS
Well Elevation (ft/msl) Well Depth (ft)
Depth to Ground water (ft) Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)
1st 5 - 9 4 (STD) 1st 150 um/cm EH 2 = 4 mv units units
2nd 5 9 5 (STD) 2nd 5 C univer EH 224 mv units
3rd
4th (STD) 4th univem
ph spec, cond. (other parameter) value units
Sample Temp Turbidity
FIELD COMMENTS
Sample Appearance:
Weather Conditions: 5 - nny , 65° F 40 meh winds
Other Egypment blank performed at CWIT, Purchased
distilled water was run through a dispesable builer
then I must nich to bettles, for filtered Parameters
materials transferred from barlor to filtering x1231
and filtered
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: MIKE Zarenski Employer: 5 alder
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
4 Inta man January 318



ETC JOB # CA 4423
Sample Point W ON B 1 1 1 1 1 Source Code Sample Point I.D.
FIELD PROCEDURES
PURGE DATE START PURGE ELAPSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
SAMPLING METHOD:
Sampler Type E A-Submersible Pump D-Dipper/Bottle E-Bailer X-Other
Sampler Material A A-Teflon C-PVC D-Plastic X-Other B-Metal D-Plastic X-Other
Tubing Material NA A-Teflon C-Polyethylene X-Other SPECIFY OTHER)
Sample Composited Y(N)
Procedure/Proportions
FIELD MEASUREMENTS
Well Elevation (ft/msl) Well Depth (ft)
Depth to Ground water (ft) Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)
1st U A 9 (STD) 1st B O um/cm EH A 25°C (other parameter) value units
2nd 650 (STD) 2nd 820 um/cm EH 143 mV spec. cond. (other parameter) value units
3rd stD) 3rd um/cm at 25°C (other parameter) value units
4th (STD) 4th um/cm at 25°C
ph spec. cond. (other parameter) value units
Sample Temp Turbidity
FIELD COMMENTS Sample Appearance: REDDISH BROWN SWSPENDED MATTER
Other: TWGE VOLUME CALC WELL DEPTH - DEPTH OWNTOR X 1662 X 3 17:10 - 69:01 - 10:17
-652 gal ft of 4" casing
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELER Employer: GOLDER ASSOC INC.
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
910412 Styling Warden



	ETC JOB# <u>CA6424</u>
,	Sample Point Source Code Sample Point LU.
FIELD P	ROCEDURES
PURGE DATE START PURGE ELAI	SEED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
SAMPLING METHOD:	
Sampler Type A-Submersible Pump B-ISCO B-ISCO C-Bladder Pump D-Dipper/B-E-Baller F-Scoop/St	X-Other
Sampler Material A-Tetlon B-Metal C-PVC D-Plastic	X-Other (SPECIFY OTHER)
Tubing Material A-Tellon C-Polyethyl D-Silicon	ene X-Other SPECIFY OTHER
Sample Composited YN	Procedure/Proportions
EIEI D ME	ASUREMENTS
Well Elevation (ft/msl) Depth to Ground water (ft) Groundwater Elevation (ft msl)	Well Depth (ft) Sample Depth (non-well) (ft)
1st Sibi 1st Spec. cond.	um/cm EH
	units E H (other persmeter) value units
	uni/cm It 25°C (other peremeter) value units
	uni/cm It 25°C (other parameter) value units
FIELD (COMMENTS
Sample Appearance: CLOVOL, Some	suspended Particles
Weather Conditions: SUNNY WORY W	· · · · · · · · · · · · · · · · · · ·
	4 Po Alles) 500. 1 SOTALL OF HITSO - HITS
$\frac{1}{2} \frac{1}{2} 19.4F= 6 1 500 x 05.86 = F.F-0.	
Well elevation not surv	eyed, elevation unknown.
FILTERING: Use Chain of Custody (CC1) to i	ndicate which bottles were filtered
Sampler: STEPHEN A. WHEELER	Employer: Golobe Assoc INC
$\overline{}$	e with applicable EPA state and corporate protocols.
910412 Styphell Wheel	_
Andrea (military)	



Sample Point Source Code Sourc
PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURCE CATE PURC PURCE PURCE PURCE PURC PURC PURC PURC PURC PURC PURC PURC
PURCE DATE (TY MAN DO). SAMPLING METHOD: Sampler Type
Sampler Type E BISCO C-Bladder Pump E-Baller
Sampler Type E Bladder Pump E-Scoopfshovel X-Other GPECIFY OTHER Sampler Material A A-Teffon B-Tygon C-PVC Plastic X-Other GPECIFY OTHER Tubing Material MA A-Teffon B-Tygon C-Polyethylene X-Other GPECIFY OTHER Sample Composited Y(N) Procedure Proportions
Sampler Material A B-Metal D-Plastic X-Other GEPCIFY OTHER) Tubing Material MA A-Teffon B-Tygon C-Polyethylene D-Silicon X-Other GEPCIFY OTHER) Sample Composited YM Procedure/Proportions FIELD MEASUREMENTS Well Elevation (ft/msl) * Well Depth (ft) Clubsol D-Silicon Compositions Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Clubsol D-Silicon Cl
Sample Composited YN FIELD MEASUREMENTS Well Elevation (ft/msl) * Well Depth (ft) C D D Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Let Depth to Ground water (ft) T D D Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Let Depth to Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Let Depth to Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Let Depth to Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Let Depth to Groundwater Elevation (ft msl) Sample Depth (non-well) (ft) Sample Depth (non-well) (ft) Let Depth to Groundwater (ft) Sample Depth (non-well) (ft) S
FIELD MEASUREMENTS Well Elevation (ft/mst) * Well Depth (ft) Clustol Depth to Ground water (ft) 7 3 Sample Depth (non-well) (ft) Groundwater Elevation (ft mst) Well Depth (non-well) (ft) # WELL NOT SWAYEND WIFORMATION WANALABLE 1st 5 0 0 3 (STD) 1st Cl250 window espec. cond. (other persenter) Value winds 2nd 5 0 0 3 (STD) 2nd Cl250 window EH Cl550 window 3rd STD) 3rd SPD. cond. st 25°C (other persenter) Value winds 4th Sample Temp Turbidity NTU Sample Appearance: CLOWY Weather Conditions: SWANY VERY WINDLY 40°E
FIELD MEASUREMENTS Well Elevation (ft/msl) * Well Depth (ft) 2 50 Depth to Ground water (ft) 7 3 Sample Depth (non-well) (ft) Groundwater Elevation (ft msl) Well Depth (non-well) (ft) # WELL NOT SURVEYED BLFORMATION UNAVAILABLE 1st 5 0 3 (STD) 1st 2 2 5 0 under permeter) Value units units 2nd 5 6 3 (STD) 2nd 2 5 0 under permeter) Value units units 2nd 5 6 3 (STD) 3rd Sepec. cond. United units 3rd 1 (STD) 3rd Sepec. cond. St 25 °C (other permeter) Value units 4th 1 (STD) 4th Sepec. cond. St 25 °C (other permeter) Value units 4th 1 (STD) 4th Sepec. cond. St 25 °C (other permeter) Value units Sample Appearance: CLOUNY Weather Conditions: SUNLY VERY WILLDLY 40°E
Well Elevation (ft/msl) * Well Depth (ft)
Depth to Ground water (ft) Groundwater Elevation (ft msl) # WELL NOT SURVEYED BUFORMATION UNANALABLE 1st 5 0 3 (STD) 1st 2250 under peremeter) 2nd 5 10 3 (STD) 2nd 25 50 under peremeter) 3rd
Groundwater Elevation (ft msl) # WELL NOT SURVEYED SUFFORMATION WHAVAILABLE 1st 5 0 0 3 (STD) 1st 21250 urn/cm EH 257 m/ 2nd 5 10 3 (STD) 2nd 2250 urn/cm EH 250 m/ ph spec. cond. et 25°C (other parameter) value units 3rd ph spec. cond. at 25°C (other parameter) value units 4th ph spec. cond. at 25°C (other parameter) value units FIELD COMMENTS Sample Appearance: CLOWY Weather Conditions: SWALY VERY WINDY 40°E
WELL NOT SURVEYED BLIFORMATION WHAVAILABLE 1st 5 0 0 3 (STD) 1st 21550 uniform EH 25°C (other persmeter) value units 2nd 5 10 3 (STD) 2nd 2250 uniform epec. cond. (other persmeter) value units 3rd 5 (STD) 3rd uniform at 25°C (other persmeter) value units 4th 5 (STD) 4th 4th 4th 4th 4th 4th 5 (STD) 4th 5 (STD) NTU Sample Temp Turbidity FIELD COMMENTS Sample Appearance: CLOWNY Weather Conditions: SWANNY VERY WINNY 40°E
1st 5 0 0 3 (STD) 1st 21250 um/cm EH 25 T m/ 2nd 5 10 3 (STD) 2nd 2250 um/cm EH 25 to (other parameter) value units 3rd
2nd 5 2nd 2nd 2250 um/cm et 25°C (other parameter) value units 3rd 1 (STD) 3rd 1 um/cm at 25°C (other parameter) value units 4th 1 (STD) 4th 1 um/cm at 25°C (other parameter) value units FIELD COMMENTS Sample Appearance: CLOWY Weather Conditions: SWAY VERY WINDY 40°E
2nd spec. cond. et 25°C (other parameter) value units 3rd (STD) 3rd spec. cond. units 4th (STD) 4th units ph spec. cond. units at 25°C (other parameter) value units trubidity FIELD COMMENTS Sample Appearance: CLOUDY Weather Conditions: Sunty VERY WINDY 40°E
3rd spec. cond. at 25°C (other parameter) value units 4th (STO) 4th spec. cond. at 25°C (other parameter) value units FIELD COMMENTS Sample Appearance: CLOWN Weather Conditions: SWINN VERY WINNY 40°E
Sample Appearance: CLOUDY Weather Conditions: Signer: Cond. Sample Appearance: Sunty VERY WILDLY 40°E
Sample Temp Turbidity FIELD COMMENTS Sample Appearance: CLOUDY Weather Conditions: SUNNY VERY WINDY 40°F
Sample Appearance: CLOWY Weather Conditions: SWAY VERY WILLDY 40°F
Weather Conditions: SUNNY VERY WINDY 40°E
Office:
PURGE YOU CALC : DEPTH OF WELL - DEPTH TO WATER X , 1652 (CA) IT of 4" COSING)
X 3 : PURGE VOLUMED
26.50-7.31=19.19 x.652 x 3 = 37.54
<u> </u>
Ell TEDING: Use Obein of Quetody (OO4) to indicate which bettles were filtered
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELER Employer: GOLDER ASSOC INC
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
91/04/12 TipallWard

СН ——	AIN	OF CU	STODY	FORM (CC1)	Date Sealed	91/04/U5 B	3y: <u>www</u> 4/15/41			
C	ompar	ny: <u>C/C</u>	INDUST	RI-PLEX SITE	Attn	.: GOLDER ASS				
Fac	ility/Sii	te:			Phor	ne: <u>(617) 938</u>	- 0530			
	Addres			ON OF COMMERCE WAY & EVENUE, WOBURN, MA C	1801					
				SAMPLE IDENT	FICATION					
Faci	ility:	<u> 6 0</u>	LD 1	SIRITI M	S x 17 tx S	PIKE Sample Point Descriptions)				
Sam	ple Po					Start Time - Etapsed	<u></u>			
	urce Code		w1	(left justify) (YYII	4M/DD) (2 ((400 hr. clock) (compos 0945) Mr. 4/10	site) of 9.1			
	il(W) il(\$)	Outfall River/Strea		eration Point(G) Treatment Facility .	(T) Lake/Ocea		er(
	· .	BOTTLE		SHUTTLE CO	NTENTS	SAMPLER	LAB			
No	Type	Size	Preserv.	ANALYSIS	Fill. (Y/N		Observations			
1	MET	1 000	Нии3	METALS .		QED model	V			
1	Ctins	125	H2504	TOC/COD *		FF 8200	V			
1	CONS	1000	H2S04	NH3/TKN		field Filter	Vi			
1	CHAL	125	NUNE	SOLIDS/TD 5		used	1			
1	UTB	4ü	GC/MS	TEMPERATURE Shottle	· I					
		,		open	69					
	T			CHAIN OF CUSTOD						
1.	1		ed By: (pri	MINY LOVENS BL	Date Seal	11011	Time: 17¢6			
			d these m	aterials in good condition from			Intact:			
2.	Name			6	•	Signature:				
_*	Date			Time:	Remark	(S:				
	I have		d these m	aterials in good condition from	the above pers					
3.	Date:	:		Time:	Remark					
	Shutt	lle Seale	d By: (prin	mike Zarenski	Date	= 4/12/91	Time: 116			
4.	Signa	ature: 🔨	بيحاكم		Şeal	#: 189326	Intact:			

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			ental Testing ication Corp. ISTODY	ORIGINAL		997) ETC Jo 91/04/05 B	.v. i.iild			
				YD1 0150 0175	<u> </u>	COLDED ACC	mr 4/15/84			
С	ompai	ny: <u>LZC</u>	INDUS	TRI-PLEX SITE		: GOLDER ASS				
	ility/Si Addre:	INI		IDN OF COMMERCE WAY & AVENUE, WOBURN, MA 01	Phon 301	e: <u>(617) 938</u>	- 0530			
				SAMPLE IDENTIFE	CATION					
Faci	lity:	G C	I L D I	SIRITI MATE	W CONTRACT	Sample Point Descriptions)				
	iple Po	Source Co (from belo	de Ye	BIAIMSD 1 91 014 our Sample Point ID Start Da (tett justify) (YY/MM/)	ite :	OIAFI Start Time - Elapsed H (compos				
	II(W) II(S)	Outfall River/Strea		tom Sediment(B) Surface Impoundment eration Point(G) Treatment Facility		ollection Sys(C) Other				
	,	BOTTLE	-	SHUTTLE CONT	ENTS	SAMPLER	LAB			
No	Туре	Size	Preserv.	ANALYSIS	FIIL (Y/N)		Observations			
1	MET	1000	HN03	METALS .	4	GED MODELL	V			
1	CLINS	125	H2S04	T0C/C0D <	Y	FF8300 WITH	V			
1	CONS	1080	H2SQ4	NH3/TKN ●	4	45 MICRON FILT	· V			
1	Cindl	125	NUNE	SOL10S/TD •	N		7			
		*		<u> </u>						
		A Line		Note: Seal # was						
				193997						
	Shut	tle Onen	ed By: (pri	CHAIN OF CUSTODY	CHRONICLE Date:	1 10 10	Time: 4,40			
1.	1		سدهامد	IN DA COLENZIO	Seal (4 17 1911	Intact: y			
2.		e receive		aterials in good condition from the	ne above pers Signatu		· · · · · · · · · · · · · · · · · · ·			
	Date	:		Time:	Remark	s:				
3.	I have received these materials in good condition from the above person. Name: Signature:									
	Date	:		Time:	 Remark	s:				
4.	Shut	tle Seale	d By: (prin	mihe Zarenski	Date	1 114 (71)	Time: 1400			
	ا	ature: 🔨	6 6	. 7	Sea		Intact: V			

C	ompar	ny: <u>_C/</u> C	INDUST	RI-PLEX SITE		Attn.:	GOLDER ASS	OCIATE	S INL.
Faci	ility/Sit	te:				Phone	: (617) 938	- 0530)
	-	INT		ON OF COMMERCE WAY	& 01801	•			
				SAMPLE IDE	NTIFICATIO	N		 	
aci	lity:	[6] C	I D I	SIRITII		(Ontional S	ample Point Descriptions)		
Sam	pie Po		0 W 4	Δ.	Start Date (YY/MM/DD)	يلا ا	AIRI) Liart Time - Elepsed (compo		
Wet	rce Code II(W) I(S)	s: Outfall River/Strea		om Sediment (B) Surface Impour eration Point (G) Treatment Faci					4XI
				SHUTTLE	CONTENTS				
No	Туре	Size	Preserv.	ANALYSIS	}	Filt. (Y/N)	SAMPLER Observations	OI	LAB beervations
1	MET	1000	HNÙ3	METALS .		7	GED WITH		
1	CLINS	125	H2504	TOC/COD °		7	45 MICRONI	1	-
1	CONS	1000	H2S04	NH3/TKN		7	A LINE FU		
I	CUNU	125	NUNE	SOLIDS/TD .		7	(MODEL FF AZ		
	υτв	40	GC/MS	TEMPERATURE when				,	
		î.		was c	hecked			1	
). E							
		<u>2</u> -	:						
	Shut	le Open	ed By: (pri	CHAIN OF CUST	ODY CHRO	VICLE Date:	4 \ (-	Time:	
1.	Signa	ature: A	ده کی بهتر ایدکشور	nt) Mike Zarenski Oznanici		Seal#	<u>4 18191</u> : 189323	Intact:	1657 V
2.		e receive		aterials in good condition f		e perso	on.		
	Date:			Time:	F	lemarks	s:	·- ·	
3.	1	I have received these materials in good condition from Name:				e perso ignatur			
	Date:			Time:	R	emarks	::		
۱,	Shuttle Sealed By: (print) Mike Zaren Ski Signature: Muchael Zarahasar).	Date: Seal	4/12/91	Time: Intact:	† 45 Y
-	'SE ON	ILY Open	ed Rv	1. Stepler	Date: 4	413	/4/Time:	12	34

				FORM (CC1)		Jeaicu	91/04/05		
С	ompan	y; <u>C</u> /C	INDUST	RI-PLEX SITE		Attn.:	GULDER ASS	SUCTATE	ES <u>, INC.</u>
ac	ility/Sit	e:		ON OF COMMERCE WA	<u> </u>	Phon	e: (617) 938	<u>- 853(</u>)
4	Addres			ON OF COMMERCE WINDENUE, WOBURN, MI					
				SAMPLE	DENTIFICAT	ION			
	lity:		Facility/Si				Sample Point Descriptions		·-
am	ple Po	int: W- Source Co (from belo		416 9	Start Date (YY/MM/DD)	s	8 13 1 S Elapsed (compo		
We	urce Code II(W) I(S)	s: Outfall River/Strea			ooundment(I) Facility(T)		•	ner	
				SHUTTI	LE CONTENT	S	(' '	,	
lo	Туре	Size Size	Preserv.	ANALYSIS	1 - <u> </u>	Fill. (Y/N)	SAMPLER Observations	0	LAB bservations
1	MET	1000	HNO3	METALS		У	in line		
1	CUNS	125	H2S04	TBC/COD.		V	filter,	1	
1	CONS	1000	H2S04	NH3/TKN/	<u> </u>	Ý	QED model	V	
1	CUNL	125	NUNE	SOLIDS/TD /		N	FF 8200 used		·
								<u> </u>	
			· · · · · · · · · · · · · · · · · · ·	, ., ., ., ., ., ., ., ., ., ., ., ., .,					
				<u>.</u>				<u> </u>	
_				·					
_								-	
			-			ONIO E		<u> </u>	
_	Shutt	le Open	ed By: (pri	CHAIN OF CU		Date:	2000	Time:	1113
	Signa	-	4	tich a. While	NHEELER	Seal #	TIVACA	Intact:	1115
2.	l have Name		d these m	aterials in good conditio	n from the at	oove pers Signatu			
••	Date:	1		Time:		Remark	5:		
<u> </u>	I have		d these m	aterials in good conditio	n from the at	oove pers Signatu			
	Date:			Time:		Remark	S:		
١.	l		d By: (prin	" Dreamed A. WHE	erer_	Date:	11 104110	Time:	M55
	Signa	ıture:			<u> </u>	Seal⊪	#: <u>186 332</u>	Intact:	<u> </u>

			ental Testing ication Corp. JSTODY	FORM (CC1)		aled	91704705 By	y: <u>WW</u>		
С	ompar	ny: <u>C/C</u>	INDUST	RI-PLEX SITE		_ Attn.:	GOLDER ASSO	CIATES, INC.		
	ility/Sit	INT		ON OF COMMERCE WAY	& 01801	_ Phon	e: (617) 938 -	0530		
	Audies			SAMPLE IDE)N				
	•	int: XJ- Source Co (Iram belo		te Code	Stan Date	ا هِا	SISIS			
	IC (W) I (S)	Outfall River/Stres		om Sediment(B) Surface Impoun eration Point(G) Treatment Facil	ily (T) L		ollection Sys(C) Other	f(ity		
	-	BOTTLE		SHUTTLE	CONTENTS	1	SAMPLER	LAB		
No	Туре	Size	Preserv.	ANALYSIS		Fill (Y/N)	Observations	Observations		
_1	MET	1000	HND3	METALS /		Y	Inline 45	/		
_1	LUNS	125	H2S04	TOC/COD /		У	Silt er	Sendre		
1	CONS	1000	H2504	NH3/TKN /		У	model QED	18		
1	CLINU	125	NUNE	SOLIUS/TO 🗸		N	FF 8200	Recolm		
_1	uTB	40	GC/MS		G WHEN CBMB90 =		used	2		
		:								
		3		CHAIN OF CUST	ODY CHRO	NICLE				
1.	1		ed By: (pri			Date:	910409_	Time: 1113		
1.	-	ature:		Steph Q. Whule-		Seal f	<u> </u>	Intact: YES		
2.	Name		d these m	aterials in good condition for		ove pers Signatu				
	Date: Time:					Remarks:				
3.	I have		d these m	aterials in good condition fo		ve pers Signatu				
	Date:		<u></u>	Time:		Remark	3:			
4.	Shutt	le Seale	d By: (prin	1) STEPHEN A. WHE	EUPL	Date:	91/04/16	Time: 1455		

			ental Testing ication Corp. ISTOD Y	ORIGINAL FORM (CC1)	Seal No. <u>189319</u> ET	•			
	Compar	w. C/C	INDUST	RI-PLEX SITE	Attn.: GULDER	ASSOCIATES. INC.			
	:ility/Si	te:	ERSECTI	ON OF COMMERCE WAY & VENUE, WOBURN, MA	Phone: (617) 9	· · · · · · · · · · · · · · · · · · ·			
_	7,00,00			SAMPLE IDEN	FICATION				
— Fac	ility:	- G C	I L D II						
San	•	Source Co (from belo	10 M - 19	RI AI POINT ID SI		psed Hours composite)			
W	elt(W) el(S)	Outfall River/Strea		om Sediment (B) Surface Impoundm Peration Point (G) Treatment Facility SHUTTLE CO	(T) Lake/Ocean (L)	Other(X) Specify			
		BOTTLE		ANALYSIS	SAMPLER	LAB			
No	Туре	Size	Preserv.	ANALIOIO	Fill. (Y/N) Observation	Observations			
_1	MET	1800	ни03	METALS .	Y GED WH	n 🗸			
1	CUNS	125	H2S04	TBC/CBD •	1 ASMICRON	101- V			
1	CONS	1000	H2S04	NH3/TKN	Y LINE FILTE				
_1	CUNU	125	NUNE	SOLIDS/TD .	N (MODEL FE				
				•					
$\overline{}$				CHAIN OF CUSTO					
1.	Sign	arnie: 🕟	<u>hellar (</u>		Date: 4\8(91 Seal#: 189319	Time: 1647 Intact: Y			
I have received these materials in good condition from Name:					the above person. Signature:				
	Date	:		Time:	Remarks:				
3.	l hav		d these m	aterials in good condition from	the above person. Signature:				
٠.	Date			Time:	Remarks:				
4.	Shut	tle Seale	d By: (prin	"MIKE Zarenshi	Date: 91/04/116	Time: 145d			

Date:

SEAL#

TEMP. C

SHUTTLE# _

Intact:

C	omnar	nv: CZE	I INDUST	RI-PLEX SITE	Attn -	GOLDER ASS	OCIATES, INC.
				,		(617) 938	
	ility/Si	INT		ON OF COMMERCE WAY &		(81/) ///	0/20
	Addres	SS: AIL	ANIIC F		<u> </u>		
		Lave	61 11	SAMPLE IDENTIFI	CATION		
	lity: ple Po	Dint: W- Saurce Co (from belo		te Code 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11121 113	mple Point Descriptions) 13.0	
We	irce Code II(W) I(S)	es: Outfall River/Strea		om Sediment(B) Surface Impoundment. eration Point(G) Treatment Facility		•	ner
	,		-	SHUTTLE CONT			
No	Туре	BOTTLE Size	Preserv.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations	LAB / Observations
,	MET	1000	HND3	TOTAL METALS	N		
	,,,	2000	11.102	1 to 1 1 top. 1 to to			
		;					
			-	spal # on			
				shittle-was			
		· Ž		193997			·
		Sec. Sec.					
		¥.					
	Shut	tle Open	ed By: (pri	MIKE Zarenski	CHRONICLE Date:	419191	Time: 1169
1.	Sign	ature:	ميدلام	O 3 menson	Seal #:	193997	Intact:
2.	I hav Nam		d these m	aterials in good condition from the	ne above perso Signature		
	Date			Time:	— Remarks:		
3.	l hav Nam		d these m	aterials in good condition from the	ne above perso Signature		
	Date	•		Time:	Remarks:		
4.		tle Seale	d By: (prin	mibe 7 arenski	Date: Seal #:	4/12/91	Time: 1400 Intact: V
	 	NLY Open	7	TSCIPCIO Date:	41.00	7)Time:	1240

CH	AIN	OF CU	JSTODY	FORM (CC1)	Date Sealed	91/04/05	By:	_
C	ompa	ny: <u>C/1</u>		TRI-PLEX SITE	Attn.:	GOLDER AS	SOCIATES, INC.	
Fac	ility/S	ite:			Phone	e: (617) 938	- ŭ530	
,	Addre			ON OF COMMERCE WAY. AVENUE, WOBURN, MA	& 01801			
				SAMPLE IDE	NTIFICATION			_
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	<u> </u>	NLY Open				N Date:	4/15	[4]Time:	/2	7/2



	ETCJOB#
	Sample Point W OW-14161 1 1 1 Source Code Sample Point LD.
FIELD PI	ROCEDURES
PURGE DATE START PURGE (YY MM DD) C2400 Hr Chock)	SED HRS WATER VOL IN CASING VOLUME PURGED (Gallons)
SAMPLING METHOD:	
Sampler Type E A-Submersible Pump D-Dipper/Bo B-ISCO E-Baller C-Bladder Pump F-Scoop/Shr	X-Other
Sampler Material A-Teflon C-PVC B-Metal D-Plastic	X-Other(SPECIFY OTHER)
Tubing Material MA A-Teflon C-Polyethyle B-Tygon D-Silicon	X-Other(SPECIFY OTHER)
Sample Composited YN	
	Procedure/Proportions
FIELD ME	ASUREMENTS
Well Elevation (ft/msl)	Well Depth (ft) 11315
	Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)	
FIELD BARAMETERS OBTAINED AFTER SA	MPLING BLENT DIVE TO EQUIPMENT PROBLEMS
	25°C EH   8 MV units
	micm E H   8 4 mV   125°C (other parameter) value units
	nvicm (other paremeter) value units
	m/cm   25°C (other paremeter) value units
Sample Temp Turbidity	NTU
FIELD C	OMMENTS
Sample Appearance: Slightly Turbid	, no odor
Weather Conditions: Sunny , 50° F Co	
	1-> 4/12/91, 329allons removed
* Information not Available	
4" digneter well	= .6529a1/f+
Purge Volume = (13,5	1-3,76)(.652)(3) = 19,05 gollens
, 3	lowed to recover before sampling
FILTERING: Use Chain of Custody (CC1) to it	
Sampler: MIKE Zarenshi	Employer: Golder Ass
I certify that sampling procedures were in accordance	with applicable EPA state and corporate protocols.
4/16/91 michan Zananshi.	332



ETC JOB#	CA6430.
Sample Point LX	1 01WI- 14 16 1 DIVLIPI 1
Source	
FIELD PROCEDURES	1
PIRGE DATE START PURGE ELAPSED HRS WATER VOL. IN CA (Gallons)	SING VOLUME PURGED (Gallons)
SAMPLING METHOD:	
Sampler Type    E   A-Submersible Pump D-Dipper/Bottle E-Bailer X-Other	(SPECIFY OTHER)
Sampler Material A - Teflon C-PVC B-Metal D-Plastic X-Other	(SPECIFY OTHER)
Tubing Material NA A-Tetion C-Polyethylene X-Other	(SPECIFY OTHER)
Sample Composited Y(1)	
Procedure/Proportions	
FIELD MEASUREMENTS	
Well Elevation (ft/msl) * Well Depth (ft)	1135
Depth to Ground water (ft) 1 316 Sample Depth (no	n-well) (It)
Groundwater Elevation (ft msl)★	
FIELD PARAMETERS OBDAILIED AFTER SAMPLING EVENT DUE	TO EQUIPMENT PROBLEMS
1st 6 19 3 (STD) 1st 8 0 0 stroker 1st 6 (other parameter	1 1113 Ø1 lmy1
2nd d 9 (STD) 2nd 800C, cond at 25°C EH	Wall 1212   Waller 179
3rd     (STD) 3rd     um/cm at 25°C (other parameter	
4th     (STD) 4th     um/cm at 25°C	
ph spec. cond. (other paramet	er) value units
Sample Temp Turbidity FIELD COMMENTS	
Sample Appearance: Slightly Turbid, Ao oder	•
Weather Conditions: Sunny seef Calm	
Other This is a diplicate sample from ou	2-46 taken
Immediately After sampling of OW-46 u	
filter, and filtering dexice.	
Purge Valume = (13.5 - 3.76) (.652) (3) =	19.05 gallons
well Purged dry after 7.0 gallons	
FILTERING: Use Chain of Custody (CC1) to indicate which bottle	es were filtered
Sampler: mike Zarensk, Employer: 6	older Ass
I certify that sampling procedures were in accordance with applicable EPA s	tate and corporate protocols.
4/16/91 michael Zamanali.	3



ETC JOB#
Sample Point W O W - 19 1 1 1 1 Source Code Sample Point I.D.
FIELD PROCEDURES
PURGE DATE START PURGE ELAPSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)  SAMPLING METHOD:
Sampler Type  E   A-Submersible Pump D-Dipper/Bottle E-Bailer X-Other
Sampler Material A-Teflon C-PVC D-Plastic X-Other SPECIFY OTHER)
Tubing Material A-Teflon C-Polyethylene D-Silicon X-Other (SPECIFY OTHER)
Sample Composited YN Procedure/Proportions
FIELD MEASUREMENTS
Well Elevation (ft/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)    Groundwater Elevation (ft msl)
1st
ph 3 put (Victor perameter) value units  9 . 0 (°C) NTU  Sample Temp Turbidity
FIELD COMMENTS
Sample Appearance: Reddish Color, Slight odor
Weather Conditions: SWHNY SLIGHT EXCEP ^ 55°F
Other: field Parameters recorded after 7.48 gallons Ift's sampling due to meter Problems h= water calumn
Purge Volume = Tr2h.7.48 = 168 gallons
Well Purged dry @ 310 gallons
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELER Employer: GOLDER, ASSOC, INC
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
91 04/16 Otyph a. Whuly

# APPENDIX F CLP Data Validation Narrative

# INDUSTRI-PLEX SITE ARSENIC PIT/CHROMIUM LAGOON GROUNDWATER INVESTIGATION

#### CLP Data Validation Narrative

#### 1.0 INTRODUCTION

Golder Associates Inc. (Golder) has performed a data Inorganic analytical data from validation of the observation well samples collected from April 11 through 18, 1991 at the Industri-Plex Site in Woburn, Massachusetts. These samples were collected for the Arsenic Pit/Chromium Lagoon Groundwater Investigation conducted as part of the Pre-Design Investigation (PDI) at the Site. The samples were analyzed for the Metals portion of the Inorganic Target Analyte List (TAL) in accordance with the Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) dated 7/88. The analyses were performed by Environmental Testing and Certification (ETC) Corp. of Edison, New Jersey (referred to as Laboratory). Both filtered and unfiltered samples were collected from twenty-two (22) primary locations to analyze for dissolved metals and total metals, respectively. Two (2) locations were sampled in duplicate yielding four (4) Field Duplicate samples (2 filtered and 2 unfiltered). Extra sample volume was collected from two (2) of the primary locations to obtain sufficient sample volumes to perform the analysis of the Matrix Spike/Matrix Spike Duplicate (MS/MSD) pairs. The sample points are summarized in Table 1.

Data Validation was performed in accordance with the U.S. Environmental Protection Agency (USEPA) Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (June 13, 1988 and modified February 1989). In addition, the Data Validation criteria from the Quality Assurance Project Plan (QAPjP) for the PDI were followed. When differing guidelines were encountered, the data validator used the more conservative (stricter) guideline. Data qualifiers are defined in Table 2.

The Laboratory had been provided with the quality control (QC) criteria set forth in the QAPjP and was to have prepared and analyzed Matrix Spike Duplicate (MSD) samples and Duplicate Control Samples (DCS). Although sufficient sample volume was collected to perform the MSD analysis, Laboratory analysts followed the 7/88 SOW and performed Sample analysis rather Duplicate than MSD analysis. Additionally, the Laboratory analyzed Laboratory Control Samples (LCS) at the frequency specified within the 7/88 SOW. However, the analysis of the DCS pairs was not performed. Although some of these additional QC samples specified within the QAPjP were not analyzed, the Laboratory did follow the 7/88 SOW and performed analysis of all QC samples specified therein.

#### 2.4 Blanks

<u>July 1991</u>

In evaluating the contaminants in the laboratory preparation blanks (PBW), the Initial Calibration Blanks (ICB), and the Continuing Calibration Blanks (CCB), the data validator determined the appropriate action levels (as specified in the USEPA Region I Data Validation Guidelines) from the associated blank having the highest level of contamination and applied these action levels to all of the associated samples within the analytical sequence. In evaluating the contaminants in the field blanks, the data validator applied the results from the filtered field blanks to the filtered samples and the results from the unfiltered field blanks to the unfiltered samples. When the same contaminant was present in the field blank as in the preparation and/or analysis blanks, the highest level of contamination was used to determine the action level.

Please note that sample volumes and dilution factors have been taken into consideration when applying the appropriate blank action levels to the samples.

Various contaminants were detected in the blanks analyzed with the filtered samples reported in SDG 000600. Potassium, Arsenic, Iron, Copper and Manganese were detected in the laboratory blanks at negative absorbances thereby causing sample results which may have been negatively influenced. non-detected results for these analytes required qualification as estimated detection limits. The positive these analytes required qualification as ues. Aluminum, Lead, Barium, Beryllium, results for estimated values. Calcium, Iron, Magnesium, Sodium, Zinc, Arsenic, Manganese and Mercury were detected at various concentrations in the laboratory and/or field blanks. Action levels were determined for each analyte. Positive results in the filtered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

Various contaminants were detected in the blanks analyzed with the unfiltered samples reported in SDG 000600. Potassium, Arsenic, Iron, Copper and Manganese were detected in the laboratory blanks at negative absorbances thereby causing sample results which may have been negatively influenced. The non-detected results for these analytes required qualification as estimated detection limits. The positive results for these analytes required qualification as estimated values. Aluminum, Barium, Beryllium, Calcium, Iron, Magnesium, Sodium, Zinc and Arsenic were detected at various concentrations in the laboratory and/or field blanks. Action levels were determined for each analyte. Positive results in the unfiltered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

which may have been negatively influenced. The non-detected results for these analytes required qualification as estimated detection limits. The positive results for these analytes required qualification as estimated values. Aluminum, Zinc, Calcium, Iron, Potassium, Copper and Arsenic were detected at various concentrations in the laboratory and/or field blanks. Action levels were determined for each analyte. Positive results in the unfiltered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

#### 2.5 ICP Interference Check Sample

The concentrations of Dissolved Calcium and/or Dissolved Iron in samples OW-17, OW-48A and OW-40 (SDG 000600) were greater than 50% of their respective levels in the Interference Check These concentrations produced suspected Samples (ICSA). Barium, Beryllium, positive interferences with Manganese, Potassium, Sodium, Vanadium and Zinc. results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification The concentration of Dissolved as estimated values (J). Sodium in sample OW-17 was significantly greater than the suspected interference level and did not qualification. The concentration levels of Dissolved Calcium Dissolved Iron also produced suspected negative interferences with Antimony and Cadmium. Positive results for these analytes required qualification as estimated values Non-detected results for these analytes required qualification as estimated detection limits (UJ).

The concentrations of Total Calcium and/or Total Iron in samples OW-17, OW-48A and OW-40 (SDG 000600) were greater than 50% of their respective levels in the Interference Check These concentrations produced suspected Samples (ICSA). positive interferences with Barium, Beryllium, Copper, Manganese, Potassium, Sodium, Vanadium and Zinc. Positive results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification as estimated values (J). The concentrations of Total Sodium in samples OW-17 and OW-48 were significantly greater than interference level and did not require The concentration levels of Total Calcium suspected qualification. Total Iron also produced suspected interferences with Antimony and Cadmium. Positive results for these analytes required qualification as estimated values Non-detected results for these analytes required qualification as estimated detection limits (UJ).

The concentrations of Total Calcium in samples OW-42 and OW-50 (SDG 000613) were greater than 50% of their respective levels in the Interference Check Samples (ICSA). concentrations produced suspected positive interferences with Beryllium, Copper, Manganese, Potassium, Sodium, Vanadium and Positive results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification as estimated values (J). The concentration of Total Zinc in sample OW-50 was significantly greater than the did suspected interference level and not The concentration levels of Total Calcium qualification. also produced suspected negative interferences with Antimony Positive results for these analytes required qualification as estimated values (J). Non-detected results these analytes required qualification as estimated detection limits (UJ).

#### 2.6 Matrix Spike Recoveries

Seven (7) primary samples {OW-48A (filtered and unfiltered) OW-18A (filtered and unfiltered) OW-42 (filtered) OW-44 (unfiltered) and OW-44 (filtered for Mercury only)} were used for Matrix Spike (MS) analysis. There were several analytes which did not meet the Contract Required Recovery criteria as specified in the SOW and the QAPjP. The actions resulting from the assessment of the MS data for filtered samples apply to all of the filtered samples for this task. The actions resulting from the assessment of the MS data for unfiltered samples apply to all of the unfiltered samples for this task.

Samples OW-42 and OW-44 were not designated for MS analysis by the sampler. It was determined by the Laboratory that additional MS samples were required to meet analytical batch QC requirements and the analysts chose to use these samples.

The MS recovery of Dissolved Selenium for OW-18A was greater than 125%. The MS recoveries of Dissolved Selenium for OW-48A and OW-42 and Dissolved Mercury for OW-18A were less than 75% but greater than 30%. The positive results for Dissolved Selenium and Dissolved Mercury in the unfiltered samples required qualification as estimated values (J). The non-detected results for Dissolved Selenium and Dissolved Mercury in the unfiltered samples required qualification as estimated quantitation limits (UJ).

The MS recoveries of Total Selenium for OW-48A and OW-44 and Total Lead and Total Mercury for OW-18A were less than 75% but greater than 30%. The positive results for Total Selenium, Total Lead and Total Mercury in the unfiltered samples required qualification as estimated values (J). The

#### 2.9 Furnace Atomic Absorption Results

Total Arsenic analysis by Graphite Furnace Atomic Absorption (GFAA) was performed for all samples except OW-47, OW-43, OW-37, OW-45 and OW-12 which were analyzed by ICP. The post digestion spike recoveries for the remaining samples met the 85%-115% criteria.

Samples OW-46, OW-46DUP, OW-17, OW-38, OW-40 and OW-48 required analysis for Total Arsenic using the Method of Standard Addition (MSA). All criteria for MSA analysis were achieved.

Dissolved Arsenic analysis by GFAA was performed for all samples except OW-47, OW-43, OW-37, OW-45 and OW-12 which were analyzed by ICP. The post digestion spike recoveries for OW-22, OW-44 and O2EQB did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values.

Samples OW-46, OW-46DUP, OW-17, OW-14 and OW-48 required analysis for Dissolved Arsenic using MSA. All criteria for MSA analysis were achieved.

Total Selenium analysis by GFAA was performed for all samples. The post digestion spike recoveries for OW-46, OW-46DUP, OW-9, OW-17, OW-38, OW-48, OW-48A, OW-18A, OW-37, OW-50A, OW-18, OW-49, OW-49DUP, OW-44, OW-50 and OW-49A did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values. The non-detected results for this analyte required qualification as estimated detection limits.

Samples OW-14, OW-40, OW-43 and OW-45 required analysis for Total Selenium using MSA. All criteria for MSA analysis were achieved.

Dissolved Selenium analysis by GFAA was performed for all samples. The post digestion spike recoveries for OW-46, OW-46DUP, OW-9, OW-17, OW-38, OW-48, OW-48A, OW-18A, OW-47, OW-50A, OW-18, OW-22, OW-49DUP, OW-44, OW-42, OW-50 and OW-49A did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values. The non-detected results for this analyte required qualification as estimated detection limits.

Samples OW-14, OW-40 and OW-43 required analysis for Dissolved Selenium using MSA. All criteria for MSA analysis were achieved.

#### 2.11 Detection Limit Results

All criteria for Instrument Detection Limits and Reporting Requirements were met by the Laboratory.

#### 2.12 Sample Results

All sample results were within the linear range for ICP analysis and within the calibration range for Graphite Furnace Atomic Absorption analysis and Mercury analysis.

#### TABLE 1 (continued)

#### CLP Sample Point Identifications for PDI Arsenic Pit/Chromium Lagoon Groundwater Investigation Samples

#### Total Metals

Sample Point ID	ETC ID	SDG
OW-14	CA6450	000600
OW-17	CA6451	000600
01EQB	CA6452	000600
OW-38	CA6453	000600
OW-48	CA6454	000600
OW-48A	CA6455	000600
OW-48AMS	CA6455MS	000600
OW-48AMSD	CA6455MSD	
OW-40	CA6458	000600
OW-46	CA6459	000600
OW-46DUP	CA6460	000600
OW-9	CA6461	000600
OW-47	CA6462	000612
OW-43	CA6463	000612
O₩-37	CA6464	000612
OW-22	CA6465	000612
OW-50A	CA6466	000612
OW-18	CA6468	000612
OW-18A	CA6469	000612
OW-18AMS	CA6469MS	000612
OW-18AMSD	CA6469MSD	
OW-45	CA6471	000612
OW-44	CA6472	000613
OW-49	CA6473	000612
OW-49DUP	CA6474	000612
OW-12	CA6475	000613
OW-42	CA6476	000613
OW-50	CA6565	000613
OW-49A	CA6566	000613
02EQB	CA6594	000613

# APPENDIX G Non-CLP Data Assessment

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

# ASSESSMENT OF OVERALL DATA QUALITY FOR TASK 37

PER	FORMED BY: Lori Anne Hendel Lecy Les Hendel DATE: July 8.	1991
		YES/NO/NA
1.	Were the QAPjP, laboratory reports, and field documentation available to support data assessment procedures?	yes
2.	Precision:	
	Are DCS RPD within control limits? Are lab duplicate RPD within control limits? Are field duplicate RPD within control limits? Are MS/MSD RPD within control limits? Overall assessment of precision <u>@ Not in all cases</u> Assessment of Laboratory Performance form for partic Overall, the precision of the measurements is accept this task.	ulars.
3.	Accuracy:	
	Is absolute recovery within control limits for DCS? Is relative recovery within control limits for MS/MSD? Overall assessment of accuracy <u>@ Not in all cases;</u> Assessment of Laboratory Performance form for partic Overall, the accuracy of the measurements is accepta this task.	ulars.
4.	Representativeness:	
	Were procedures in the FSP followed? If not, were procedural variations approved and documented?	yes N/A
	Were sample preservation procedures given in the FSP followed?	yes
	Were data reported in the proper units? Was blank contamination not evident or well documented at low levels?	yes yes@
	Were field duplicates within control limits?  Overall assessment of representativeness <u>@ Not in refer to Assessment of Laboratory Performance form f</u>	no@ all cases;
	particulars. The qualified data represents conditions Site.	

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

# ASSESSMENT OF LABORATORY PERFORMANCE FOR TASK 37

$\mathbf{L}_{i}$	ABO	RATORY: ETC Corp./ Chyun Associates REPORT #: 000600	<u>, 612, 613</u>
v.	ALI	DATED BY: Lori Anne Hendel Locales July 8, 199	1
-			YES/NO/NA
• ;	1.	Release authorization with signature present?	yes
:	2.	Sample identification summary/description present?	N/A
<b>!</b> :	3.	Analytical results present, including:	yes
Í		correct units? detection limits?	yes yes
		method used?	yes
		date sampled?	yes
l		date received?	<u>yes</u>
		date prepared?	yes
_		<pre>date analyzed? dilutions noted?</pre>	yes yes
l		dilucions noted:	yes
4	4.	Holding times met?	yes*_
ي ا	5.	Lab duplicate RPDs within control limits (20%)?	yes^
		Field duplicate RPDs within control limits (30%)?	no^^
ı <del>(</del>	6.	MS/MSD % recoveries within control limits (75-125%)?	yes#
-	7.	MS/MSD RPDs within control limits (30%)?	yes##
['] 8	8.	Duplicate control sample (DCS) accuracy within given control limits (80-120%)? (Blank Spikes)	yes@
9	9.	DCS precision within given control limits (20%)?	yes@@
10	0.	Method blanks "clean"?	yes
1:	1.	Chain-of-Custody present and complete with signatures and dates?	yes
13	2.	Name of analyst/supervisor given?	yes
13	3.	Procedural deviations noted?	yes
14	4.	QC procedures given?	N/A

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

# ASSESSMENT OF FIELD PERFORMANCE FOR TASK 37

SAM	PLER/ORGANIZATION: <u>Michael J. Zarenski (Golder)</u> REPORT # <u>Stephen A. Wheeler (Golder)</u>	:000600, 612, 613
VAL:	IDATED BY: Lori Anne Hendel   Con Alec Mide   DATE: Jul	y 8, 1991
		YES/NO/NA
1.	Does field documentation include:	
	date/time samples collected?	yes
	sample location?	yes
	name of sampler?	<u>yes</u>
	field measurements?	yes
	sampling method?	<u>yes</u>
	instruments/methods for field measurements?	<u>yes</u>
	calibration/maintenance of field instruments?	no^
	sampling containers used (COC*)?	<u>yes</u>
	sample preservation procedures (see COC*)?	<u>yes</u>
	Chain-of-Custody procedures?	<u>yes</u>
	field quality control procedures?	<u>yes</u>
2.	Were procedures in the Field Sampling Plan followed? If not, were procedural variances approved and	<u>yes</u>
	documented?	N/A
_		
3.	Was contamination of field blank samples not	
	evident, or well documented at low levels?	yes+
4.	Are field duplicates within control limits?	no=
5.	Comments: ^ Per the instructions of the Task Manager,	Redox
	Potential (Eh) was measured using an ORP Probe wh	
	calibrated daily. pH and specific conductivity me	ters were
	properly calibrated on a daily basis.	
	+ Low level metals were detected in the equipment blan	<u>ks. Also,</u>
	Ammonia and Total Kjeldahl Nitrogen at 3.7 mg/l each	<u>, and Total</u>
	<u>Dissolved Solids at 56 mg/l.</u>	
	_, _,	
	= Field Duplicate RPDs were out-of-control for the fol	lowing:
	OW-46 - TOC (108%)	(2000)
	OW-49 - Ammonia (62%) and Total Kjeldahl Nitrogen	(101*)

^{*} Chain-of-Custody Form

C	ompar	ny: <u>C/C</u>	INDUST	RI-PLEX SITE	Attn.:	GOLDER AS	SOCIATES, INC
Faci	ility/Si	te:			Phon	e: <u>(617) 938</u>	- 8530
,	Addres			ON OF COMMERCE WAY & UENUE, WOBURN, MA 0180	01		
				SAMPLE IDENTIFICA	ATION		
aci	lity:	ع إنا أ	DILDII	S R T   L	(Optional :	Sample Point Descriptions	· · · · · · · · · · · · · · · · · · ·
	ple Po	Source Co (from belo		441   D   I O4   Dur Sample Point ID Start Oate (YY/MM/OD)		# 15 D L L Start Time Comp	
Wel	II (W) I (S)	Outfall		om Sediment(8) Surface Impoundment	* *	ollection Sys(C) Ot	her
				SHUTTLE CONTE	NTS		
No.	Type	Size	Preserv.	ANALYSIS	Fill (Y/N)	SAMPLER Observations	LAB Observations
1	MET	1000	НИОЗ	METALS /	Y	·45 MICCON	V
1	CUNE	125	H2SO4	TOC/COD /	У	FICTER USED	
1	CONS	1000	H2S04	NH3/TKN /	У		*
1	CUNL	125	NUNE	SOLIDS/TD /	N		
1	итв	40	GC/MS	TEMPERATURE MEGING WINE			
				SWITTLE OPEN			
$\neg \dagger$							
	<u> </u>						
				CHAIN OF CUSTODY C	HRONICI E		
	Shut	tle Open	ed By: (pri		Date:	910409	Time: 1054
1.	Signa	ature:		Chool V. WAULE	Seal #		Intact: YES
	l hav Nam	٥.		aterials in good condition from the	•	1 7 / 1	1 /
2.	116	·	Savio S		Signature:		
	Date	4/17	1/71	Time: 14-50	Remark	s:	<u> </u>
	I hav		ed these m	aterials in good condition from the	above pers Signatur		
3.					•		301
-	Date			Time:	Remark		
4.			d By Horin	pavio 15. LET	Date:	4////	Time: 153
	Signa	ature:	Nin	hughly,		187342	Intact:

	OF CO	וטטוני	FORM (CC	Date	Sealed	91/04/U5 E	y:
ompar	ıy: _ C/C	INDUST	RI-PLEX SIT	E	Atin.:	GOLDER ASS	OCIATES, INC.
ility/Si	te:		ON OF COMME	DOF 114V	Phone	e: (617) 938	- 0530
Addres			NUENUE, WOBU		<u>1</u>		
-			S	AMPLE IDENTIFICA	TION		
lity:		Facility/Si			(Optional S	ample Point Descriptions)	
iple Po	Source Co	de Ye	JZ	91/014/ Start Date	<del>/ </del>	91410 Liepend P	
urce Code	(from belo is: Outfall		(left justify) com Sediment (B)	(YY/MM/DD) Surface impoundment (ii		(Composition Sus	er(X)
il(S)	River/Strea			Treatment Facility(T	) Lake/Ocean		
1	BOTTLE			MALYSIS		SAMPLER	LAB
Туре	Size	Preserv.		WALTON	FIIL (Y/N)	Observations	Observations
MET	1000	HN03	METALS .		Y	· 45 Miceon	V
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CONS	1000	H2SD4	NH3/TKN •	<u></u>	у		419
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1		ed By: (pri	"" <u>Mike Z</u>	arenski	Date: Seal #	189349	Intact: 1638
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Date		<u> </u>	Time:		Remarks	S:	
I hav		d these m	aterials in good	condition from the a	above perso Signatur		: Zn
Date:			Time:		Remarks	o:	JU.
1		d By: (prin	1) MIKE ZA	Pernski	Date:	4/18/91	Time: 1005
Signa	ature: h	مملاهد	0-7	more !	Seal	187356	Intact:

		and Armen	FORM (CC1)		91/04/05	<del></del>	C 7110
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Addre	as: ATL	ANTIC A	NUENUE, HOBURN, MA	61061	<b>20</b> -7		
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lity:	G, C	յել Օլ Iլ	S _I R _I T _I				
=					Sample Point Descriptions	1.1	
, p.c	Source Co (from belo	de Yo	our Sample Point ID S	tart Date 8	Start Time Elapsed 00 hr. clock) (ohmp		
irce Code	es: Outfalf	(O) Bott	om Sediment (B) Surface Impoundm	vent(I) Leschate Cr	ollection Sys(C) Ot	:her	
(S)(S)	River/Stree	ım(R) Gen	eration Point(G) Treatment Facility SHUTTLE CO	(T) Lake/Ocean			
	BOTTLE			JAIEAIS	SAMPLER		LAB
Type	Size	Presery.	AMALVEIS	FIIL (Y/N)	Observations	Ob	servations
MET	1000	HN03	METALS •	Y	· 45 MILRON	V	
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CONS	1000	H2S04	NH3/TKN •	У		1	More pre
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Nam				Signatur			
Date			Time:	Remarks	s:		
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Nam	e:	·		Signatur 	re:	<u> </u>	705
Date	:		Time:	Remarks	s:		305
Shut	tie Seale	d By: (prin	1) HIKE ZAKENSKI	Date:	4/18/21	Time:	1665
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	Environmental and Certificate OF CUS	al Testing ion Corp. CTODY FORM	ORIGINAL		<i>934)</i> ETCJ 91704795	<del></del>
Comp	inv: C/0	INDUSTRI-PLE	EX SITE	Attn ·	GOLDER AS:	SUCTATES, INC.
·						
Facility/S Addre	INTE	_	COMMERCE WAY &	B01 Phone	: <u>(617) 978</u>	- 6990
			SAMPLE IDENTIF	CATION		
acility:	GIOLL	DISRIT		(Ontional Sa	ample Point Descriptions)	· · · · · · · · · · · · · · · · · · ·
Sample P	oint: W-C		1 9 1 1 <b>9</b> 1 1 <b>9</b> 1 1 <b>9</b> 1 1 <b>9</b> 1 1 <b>9</b> 1 1	#1/17   /15	71510 Lari Time Elapsed	
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No Time	BOTTLE		ANALYSIS		SAMPLER	LAB
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<u>i</u>			CHAIN OF CUSTODY	CHRONICLE		
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l ha Nar 2.			in good condition from t		on. W	la la la la
Dat	,	191	Time: <u>/4-50</u>	— Remarks		July
I ha		these materials i	In good condition from t	he above perso Signature		
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Shu	ittle Sealed inature:	By: (print)	NOS LET	Date:	4/17/51	Time: 1539
**   At-						13 HOLL 70-1

			FORM (CC1)	Date		91/04/05	
mpa	ny:	INDUS	TRI-PLEX SITE		Attn.:	GOLDER AS	SOCIATES, INC.
			ON OF COMMERCE W	180 -	Phone	(617) 938	- 0530
ddre	ss: ATL	ANTIC A	AVENUE, WOBURN, M	1A 0180		. · · · · · · · · · · · · · · · · · · ·	
			SAMPLE	IDENTIFICA	TION	. · · · · · · · · · · · · · · · · · · ·	
ity:	(G) C	L D I	S R T		(Optional Si	emple Point Descriptions)	
ole Po		0 W -1		9 1/ 10/4 / Start Date (YY/MM/DD)	18 012 81	3 5 Ø	
ce Cod	es: Outfail River/Strea			npoundment(I I Facility(T		ilection Sys. a.; . (C) (U) (U)	ter
(0)	11110110110		<del></del>	LE CONTEN	<del></del>		
	BOTTLE	Dece-	ANALYSI			SAMPLER	LAB
Туре	Size	Preserv.		<del></del>	Filt. (Y/N)	Observations	Observations
MET	1000	HN03	TOTAL METALS .		<b>/</b>	<u> </u>	<u> </u>
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			CHAIN OF C	USTODY CH	PONICI E		
Shut	tie Open	ed By: (pri			Date:	18191	Time: 1638
Sign	ature: <u>h</u>	richar	C Zonungs	<u> </u>	Seal #:	189 349	Intact: Y
l hav Nam		d these m	aterials in good condition	on from the	above perso Signature		-
Date	):		Time:		Remarks		
l hav Nam		ed these m	aterials in good condition	on from the	above perso Signature		:
Date	•		Time:		Remarks		30
Shut	tie Seale	d By: (prin	1) MIKE ZAKENSKI		Date:	4/18/91	Time: 1005
Sign	ature:		02 7 May 200		Seal #	189345	Intact: YES_



	ETC JOB # <u>CA6563</u>
-	Sample Point W OW-1501 1 1
EIEI D O	ROCEDURES
31/10/4/17 1/13/4/5 31	SED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
-SAMPLING METHOD:	
Sampler Type  A-Submersible Pump B-ISCO B-Bailer C-Bladder Pump F-Scoop/Sh	X-Other
Sampler Material A A-Teflon C-PVC B-Metal D-Plastic	X-Other
Tubing Material A-Teflon C-Polyethyl B-Tygon D-Silicon	ene X-Othei GPECIFY OTHER)
Sample Composited Y®	Procedure/Proportions
EIFI D ME	ASUREMENTS
Well Elevation (ft/msl)	Well Depth (ft) 5000
<b>*</b>	75
1st D 7 7 (SIU) 1st 2 7 0 0	125°C EH 182 MV units
	1 25°C (other persmotor) value units
	t 25°C (other parameter) value units
	rm/cm 1 25°C - tother perameter) value units
9 (°C) Sample Temp	NTU
	COMMENTS
ロー・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	comments now a odor
Weather Conditions: Cloudy 45°F , Wine	1 5-Days NE.
Other: Purge vol = (3)(36.90)(6.652	) \$ 652 fell ft 4" casing
well Purged day, Aprex 1500	egallons removed over 2 days of
	dwelpment development
Well not surveyed of to	ne of sampling.
FILTERING: Use Chain of Custody (CC1) to i	ndicate which bottles were filtered
Sampler: Hire ZAKENSKI	Employer: Godber Assoc
I certify that sampling procedures were in accordance	with applicable EPA state and corporate protocols.
4/18/91 mukan Zamenshi	- 311



	ETC JOB # <u>CA4564</u>
•	Sample Point W O W - H 19 1A I I I
	Source Code Sample Point I.D.
FIELD I	PROCEDURES
91116141118 0181113	1.12 1/1/1214 11 1614
PURGE DATE START PURGE ELA (YY MM DD) (2400 Hr Clock)	PSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
SAMPLING METHOD:	
A-Submersible Pump D-Dipper/B	oottle
Sampler Type E B-ISCO E-Bailer C-Bladder Pump F-Scoop/S	X-Other (SPECIFY OTHER)
A-Teflon C-PVC	
Sampler Material A B-Metal D-Plastic	X-Other(&PECIFY OTHER)
Tubing Material A.T. A.Teflon C-Polyethy B-Tygon D-Silicon	X-Diper
( ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	(SPECIFY OTHER)
Sample Composited Y/N	Procedure/Proportions
FIFI D MI	ASUREMENTS
' I I I 4 4 1	
Well Elevation (ft/msl)	
boptinto diodilo water (it)	Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)	
	umica   <i>E.,</i>
1st 6 ' 4 6 (STD) 1st   836	et 25° C (other persmeter) velue units
الماحل الماحلية	umion   ,
2nd (G · T D (STD) 2nd   B 3 P	at 25°C EH S/MV
3-4       (\$10)	um/cm
3rd (STD) 3rd spec, cond.	at 25°C (other parameter) value units
4th (STD) 4th	um/cm
ph epec. cond.	(other parameter) value units
Sample Temp Turbidity	] мти
	COMMENTS
l	no odor
Weather Conditions: (Loudy 45°F)	Winds 5-10 mps NE
Other: Purge vol = (3)(17.24)(0.0	(52) 0.652 oul/ft 4" casing
= 33.72 gals	<del></del>
<i>J</i>	
FILTERING: Use Chain of Custody (CC1) to	indicate which bottles were filtered
Sampler: MIKE ZAKENSKI	Employer: GOLDER ASSOCS.
ι cerτιτy that sampling procedures were in accordance	e with applicable EPA state and corporate protocols.
4/18/91 nuclaus 7 summeri	_ 313
(Date) ' (Signature)	

		ntal Testing cation Corp. ISTOD Y	FORM (CC1)	Date Sealed	91/04/16	By:	A
Compar	ıy: <u>C/O</u>	INDUST	RI-PLEX SITE	Attn.:	GOLDER AS	SOCIATI	ES, INC.
:ility/Sit	te:		1	Phone	(617) 938	- 155	3
Addres			ON OF COMMERCE WAY & OLE WOBURN, MA 018	01			
		·	SAMPLE IDENT	IFICATION			
ility:	GIO	LDIII Facility/Si	SIRITI I	(Optional Si	imple Point Descriptions)		
nple Po	int: W-	0 W-1	41914111 9114		44	لــــ	
	Source Cod (from below				- · · · · · · · · · · · · · · · · · · ·	d Hours positel	
urce Code elt(W) ell(S)	s: Outfall River/Strea		om Sediment (B) Surface Impoundme eration Point (G) Treatment Facility .	.,	leatien Sys(C) O		
			SHUTTLE CO				
Type	Size	Preserv.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations		LAB Ibservations
	1000		TOTAL METALC	N		1./	
MET	1000	<u>HN</u> 03	TOTAL METALS				
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			CHAIN OF CUSTOD	V CHRONICI E			
Shut	tle Open	ed By: (pri		Date:	4 18/91	Time:	1634
Signa	ature:	micha		Seal #:		Intact:	<del>y</del>
· ·		d these m	aterials in good condition from				
Nam	e: 	. <del>=</del>		Signature——	e: 		·
Date	:		Time:	Remarks	·		
§ .		d these m	aterials in good condition from				
Nam	e: ———			Signature	9; 		
Date:	:		Time:	Remarks			3
Shuti	tle Seale	d By: (prin	1) MIKE ZARENSKI	Date:	4/18/91	Time:	1240
Signa	ature: M	uchoa	On Zarens	Seal #	<del></del>	intact:	
			11 11000 - 1100	11101	97Time:	42	<i>A</i>



	ETC JOB# -CA6489 CA6593 4/A
-	Sample Point X DIZIELOIGI I I I
	Source Code Sample Point I.D.  FIELD PROCEDURES
T	PURGE DATE (YY MM DD) (2400 Hr Clock) (Gallons) (Gallons)
#	SAMPLING METHOD:
	Sampler Type  A-Submersible Pump B-ISCO C-Biadder Pump D-Dipper/Bottle E-Bailer F-Scoop/Shovel  X-Other (SPECIFY OTHER)
T	Sampler Material A-Teflon C-PVC C-PVC D-Plastic X-Other C-PVC D-Plastic X-Other
	Tubing Material A-Tefion C-Polyethylene D-Silicon X-Other C-Polyethylene
T	Sample Composited YN
	Procedure/Proportions  EIELD AREA CLID ENGENITO
T	Well Elevation (ft/msl)  Depth to Ground water (ft)  FIELD MEASUREMENTS  Well Depth (ft)  Sample Depth (non-well) (ft)
T	Groundwater Elevation (ft msl)
	1st 6-50 (STD) 1st spec. cond. 6 at 25°C (other persmoter) value units
	2nd 6 - 3 7 (STD) 2nd spec cond. control (other personator) value units
	3rd (STD) 3rd um/cm at 26°C (other parameter) value units
	4th (STD) 4th wm/cm at 25°C (other personals;) value units
	Sample Temp Turbidity
	FIELD COMMENTS
	Sample Appearance: Clear, no odor  Weather Conditions: Cloudy, Slight Drerze, 45°F  Other:
Ť	distilled water transferred from 15 gallon
١	nalgene container into bailer then to bottles
T	Littered Samples filtered using Transfer vessel used for all other wells
_	
Ψ-	FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
-	Sampler: Mike Zarenski Employer: Golder Assoc.
Ÿ	I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
	4 18/91 maland zonemani

LTC CHAIN		-	FORM (CC1)	Seal No. Date Sea		<i>9</i> 93/9 _ ETC Jo	b# <u>CA6432</u> by: <u>iaiW</u>
:_ility/Sit	te:	EKSECTI	RI-PLEX SITE ON OF COMMERCE WAY & UENUE, WOBURN, MA	01801		GOLDER ASS e: (617) 938	OCIATES, INC. - U930
-		·	SAMPLE IDENT	TFICATION	1		
a lity:  ample Po	int: W- Source Co (from belo	de Yo	le Code 4.7. 9. 19. 19. 19. 19. 19. 19. 19. 19. 19.	1	L	tan Time Elapsed Hon, clock)	
Fell (W) Soil (S)	Outfall River/Strea		om Sediment (B) Surface Impoundme eration Point (G) Treatment Facility	,, –		llection Sys(C) Othe	er (X)
			SHUTTLE CO	NTENTS			
No Type	BOTTLE Size	Preserv.	ANALYSIS	F	IIL (Y/N)	SAMPLER Observations	LAB Observations
MET	1000	HNÜ3	METALS *		Υ	QED WITH .45	/
1 CUNS	125	H2SU4	T0C/C0D •		<u> </u>	HICKON IN-TIME	. )
CONS	<b>10u</b> u	H2S04	NH3/TKN •		7	FILTER (MODEL	## 8200 )**
CUNU	125	NUNE	SOLIDS/TD *		И		/
T UTB	40	GC/MS	Bottle m TEMPERATURE when a				X
			in,				
			-				
			CHAIN OF CUSTO	DY CHRON	ICLE		
Shuti Sign:	tle Open ature: 🗠	ed By: (pri	MIKE Zarenski		Date: Seal#	418191	Time: 1647 Intact: y
I hav		ed these m	aterials in good condition from		e pers gnatur		
Date	•		Time:	Re	emarks	3:	
i have Name		ed these m	aterials in good condition from		e perse gnatur		341
Date:			Time:	Re	emarks	s:	
4	tle Seale ature:	d By: (prin	Mike Zarenski		Date: Seal	71104 110	Time: 145¢/
AB USE ON		,, ,	~ F	ate:	HT:	7 9)Time:	1245 2 tact

С	ompan	v: <u>C/C</u>	INDUS]	RI-PLEX SITE		Attn.:	GOLDER ASS	OCIATE	S. INC
	ility/Sit	•	ings surface John	<b>y4</b> .			e: (617) 938		
	•	INT		ON OF COMMERCE W VENUE, WOBURN, M		_	U		<del></del>
		·· <del>·</del> ··		SAMPLE	IDENTIFICATIO	N			
aci	lity:	ن افا	L D I	SIRITI		(Ooties al S	ample Point Descriptions)		
Sam	ıple Poi		0 WI - 14		Start Date (YY/MM/DD)	6 L	lari Time Do hr. clock) Elapsed I		
We	urce Code: II(W) II(S)	s: Outfall River/Strea		eration Point (G) Treatment	Facility (T) L	ake/Ocean	ollection Sys(C) Oth		
<del></del>	<del></del>	OTTLE		SHUTT	LE CONTENTS	<del>                                     </del>	SAMPLER	<del>"</del>	LAB
No	Туре	Size	Preserv.	ANALYSI	· ·	Fill (Y/N)	Observations	ОЬ	servations
1	MET	1000	HNO3	METALS *		У	.45 micron		1
1	CUNS	125	H2S04	T0C/C00 •		夕	In line filter	15	:
1	CONS	1000	H2S04	NH3/TKN *		Υ	used QED	1	•
1	CUNU	125	NUNE	SOLIOS/TD .		N	model FF829		
					:				
					3				
			- 		200			ļ	
		ij		34		<u> </u>	<u> </u>	<u> </u>	
	Shutt	le Open	ed By: (pri	-4\	JSTODY CHRO	NICLE Date:		Time:	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1.			uckor	mike Zar Ozarenski	ens Ki	Seal #	<u>4 19191</u> : 189317	Intact:	1822
				aterials in good condition	n from the abo				
2.	Name					Signatui			
	Date:			Time:		Remark	s:		
	I have		d these m	aterials in good condition		ve pers Signatui			
3.		<del>,</del>		T:		_		<del></del>	<del>343</del>
	Date:		d By: (prin	Time:		Remarks Date:		Time:	16.55
	Jonatt	· O OBGIE	a by. (prill	milye Zare	as K.	Seal /	110-110	Intact:	<u> 1500</u>

		ental Testing ication Corp.	ORIGINAL		<u>893/7</u> ETC.		6434
A111				Date Sealed	91/04/05	. By:	
ompar	ıy: <u>    C∠′C</u>	<u> 1 NOUST</u>	RI-PLEX SITE	Attn.:	GOLDER AS	SOCIATE:	S, INC.
ility/Si	te:	Erres Est	ON OF COMMERCE WAY	Phone	e: <u>(617)                                    </u>	- 0530	<del></del>
Addres			AVENUE, WOBURN, MA	01801			
			SAMPLE IDEN	TIFICATION			
lity:	G1 0	Facility/Si	SIRITI I	(Optional S	ample Point Descriptions		
ple Po	int: W- Source Co (from belo	0   W  - 1	3-7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	Sart Date S		d Hours posite	
(W)	Outfall River/Strea		om Sediment (B) Surface Impounds eration Point (G) Treatment Facility		ollection Sys(C) O		
			SHUTTLE C	ONTENTS		- <del>   </del>	
Type	BOTTLE Size	Preserv.	ANALYSIS	Filt. (Y/N)	SAMPLER Observations	Ob	LAB servations
				V	OE0 - '	1	
MET	1000	HNU3	METALS		QEO INI	./	<u></u>
CUNS	125	H25 <b>04</b>	10C/COD -	/ V	filter	/	
CONS	1000	H2S04	NH3/TKN *		Wogel		
CUNU	125	NUNE	SOLIDS/TD •	I Y	FF-8200	//	
ати	4U	GC/MS	TEMPERATURE when	5 hottle	used		
İ			was + P	ened			
	#  						
-	*		· · · · · · · · · · · · · · · · · · ·				<del></del>
			· · · · · · · · · · · · · · · · · · ·				<u>-</u>
Shut	tle Open	ed By: (pri	nt) 16 7	Date:	419 91	Time:	1051
Sign	ature:	miche	mike Zarens	Seal #		Intact:	\ <u>\</u>
l hav Nam	e receive		aterials in good condition fro	m the above personal Signatur			
Date	:	···	Time:	Remarks	S:		
I hav Nam		ed these m	aterials in good condition fro	m the above personatur		=	
Date			Time:	Remarks	<b>3:</b>		3
Shuti	tie Seale	d By: (prin	"mibeZarenski	Date:	glacina	Time:	1500
Siss.	ature:	Mr Qa		Seal	189310	Intact:	1500 YES

c	ompar	1y: <u>C/C</u>	] INDUST	RI-PLEX SITE	Attr	: GOLDER AS	SUCIATES, INC.			
	ility/Si	-	_		Pho	ne: (617) 938	- 0530			
	-	INT		ON OF COMMERCE WAY & VENUE, WOBURN, MA 0	1801					
			·	SAMPLE IDENTI	FICATION	<del></del>				
aci	lity:	ع افا د	L D I	4 :	·					
Sam	ple Po	t	-10141-19	212         91   6	4116 L	Sample Point Descriptions)  121319  Start Time Hapsed Hoo hr. clock)    Camp				
We	urce Code ill(W) if(S)	os: Outfall River/Strea		om Sediment (B) Surface Impoundmeneration Point (G) Treatment Facility		Collection Sys(C) Ot	her(X) pecify			
		BOTTLE	-	SHUTTLE COI	NTENTS	SAMPLER	140			
No	Туре	Size	Preserv.	ANALYSIS	FILL (YA	·	LAB Observations			
1_	MET	1000	EUNH	METALS /	4	QED WITH 45	1			
1	CUNS	125	H2S04	TOC/COD W	Y	micronin-line	J			
1	СОИЗ	1000	H2S04	NH3/TKN /	\ \	filter weed	1 pecd Brok			
1	CUNU	125	NUNE	SOLIDS/TD /	Ŋ	(Model FF 88	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
						<u> </u>				
-			1							
			.45	CHAIN OF CUSTOD	Y CHRONICLE	_ <u> </u>				
1.	1	tle Open ature:	ed By: (pri	TUPR Q. WHE		# 010409 *: 0189810	Intact: YES			
•	i hav Nam		ed these m	aterials in good condition from	the above per Signati					
2.	Date	<del></del>		Time:	 Remari	Remarks:				
·	I have received these materials in good condition from the above person.									
3.	Nam	e: ——			Signati ——	Signature: 347				
	Date			Time:	Remari					
	Shut		d By: (prin	DEMON A. WHEELE		TITICATIO	Time: 1605			
4.	Sign	ature:	l hu	D 74's WAD'I' -	/ Sea		Intact: Yes			

C	ompar	ny: <u>C/C</u>	INDUST	RI-PLEX SITE		Attn.: GOLDER ASSOCIATES, INC						
90	ility/Sit	te:				Phone: (617) 938 - 0930						
	-	INT		ON OF COMMERCE WA	Y &							
	Addres	SS:	HIVIC P	WOODRIN, THE	01801	<del>-</del>						
	<del></del>		<u> </u>	SAMPLE II	DENTIFICATIO	N						
aci	ility:	<u>افا 5</u>	Facility/Si	S R T		(Öptional S	ample Point Descriptions)	·				
		Source Co (from belo		415-10-1A1 1 9	Start Date (YY/MM/DO)		tart Time Elapsed H 10 hr. clock) (compos					
We	urce Code ill(W) il(S)	Outfall River/Strea	• • •	eration Point(G) Treatment Fa		.ake/Ocean	ollection Sys(C) Other					
	ı	BOTTLE	<del></del>	· ·	E CONTENTS		SAMPLER	<del></del>	LAB			
ok	Type	Size	Preserv.	ANALYSIS		FIIL (Y/N)	Observations	70	bservations			
1	MET	1000	HNO3	METALS /		Y	QED WITH 45	V				
1	CUNS	125	H2504	TOC/COD /		7	moran filter used	1				
1	CONS	1000	H2504	NH3/TKN /	<u>-</u>	4	(Moder PF 8800)	V				
1	CUNU	125	NUNE	SOLIDS/TD		N		/				
1	итв	<u>.</u> 40	GC/MS		ACTUS							
					·							
					-							
				-	11 N/2							
				`\.								
									<del></del>			
	LI			CHAIN OF CU	STODY CHRO	NICLE		1				
1.	l l		ed By: (pri	CIENHEN V.	WHERE	Date:	710709	Time:	1349			
_		ature:		pan W. Wanen	from the she	Seal #		intact:	YES			
2.	Nam		d these in	aterials in good condition		Signatur						
	Date: Time:					Remarks:						
3.	I have received these materials in good condition from Name:					the above person. Signature:						
	Date	•	,	Time:		Remarks	:		J 4 7			
4	Shuttle Sealed By: (print)					Date:	91/04/11.	Time:	1605			
4.	Signa	ature:	T	De Confudy	1	Spal f	189314	Intact:	YES			

C	ompar	nv: C/C	] INDUST	RI-PLEX SITE		Attn.:	GOLDER ASS	SOCIATES. IN				
						Attn.: GOLDER ASSOCIATES, IN						
	ility/Si	INT		ON OF COMMERCE WAY		_ Phon	e: <u>(617) ¥28</u>	- 0990				
	Addres	ss: <u>A</u> IL	ANTIC A	NVENUE, WOBURN, MA	01801	_						
				SAMPLE IDEN	TIFICATIO	N						
Faci	lity:	ا افا ا	Facility/S	SIRITII	<u></u>	(Optional S	Sample Point Descriptions					
Sam	ple Po	oint: W- Source Co (from belo		our Sample Point ID	Start Date YYIMMIDDI	<del></del> S	Z / / / Elapsed (compo					
	irce Code II(W)	es: Outfall	(O) Bott	om Sediment (B) Surface Impound	ment(I) L	eachate Co	ollection Sys(C) Oth	1er				
Soi	l(\$)	River/Strea	ım(Ř) Gen	eration Point (G) Treatment Facilit SHUTTLE C			(L) Spe	ecify				
		BOTTLE	-		ONTENTS		SAMPLER	LAB				
No	Туре	Size	Preserv.	ANALYSIS		Filt. (Y/N)	Observations	Observatio				
_1_	ner	1000	HNU3	METALS /		у	· 45 Microns	1				
_1	CUNS	125	H2504	TOC/COD 🗸		У	FIELD FILTER					
1	CONS	1000	H2SO4	NH3/TKN /		Y	USED	V *				
1	CUNL	125	NONE	SOLIDS/TD /		N		/				
_1	υгв	40	GC/MS		e when							
				•								
			<b>9</b> .0	CHAIN OF CUSTO	ODY CHRO	NICLE		<u> </u>				
	Shut	tle Open	ed By: (pri			Date:	910409	Time: \359				
1.	Sign	ature:	S	pan D. WRule		Seal #	CIBR 345	Intact: VES				
	l hav Nam	٥.		aterials in good condition fro		Signature:						
2.	Mike Carenski					Michael farench						
	<del></del>			Time:12.φ		Remarks		····				
3.	I have received these materials in good condition from the Name:					above person. Signature:						
J.	Date	:	<u>-</u>	Time:		Remarks	s:	35				
4.	Shut	tle Seale	d By: (prin	" MIKE Zarenski		Date: 4 117191 Time: 125						
₹.	Sign	ature: 🔨	uchow	2 Oranailuia		_ Sealf	189346	Intact: 🗡				

<u></u>		<u> </u>	131001	FORM (CC1)	Date Seal	ed	91/04/05	By:	iul .		
Ç	ompan	y: _ C/C	) INDUST	RI-PLEX SITE		Attn	: GULDER AS	BUCIAT	ES, INC		
Faci	lity/Sit	۵۰	7	·	1	Dhor	ne: <u>(617) 938</u>	- 1153	n		
	_	INT		ON OF COMMERCE WAY & OVENUE, WOBURN, MA O	1801	-1101	16.				
		<del></del>	<u></u>	SAMPLE IDENTIF	ICATION		<del></del>		_		
Facil	ity:	G C	Eaculaty/St	গুলা া							
Samı	ple Poi		0 W- 1		4/17 Date	4	Sample Point Descriptions)  Shart Time Etapsed 400 hr. clock)				
Wel	rce Code I (W) (S)		(O) Bott	om Sediment (B) Surface Impoundment eration Point (G) Treatment Facility	(I) Leac	hate C	Collection Sys(C) Ot	her	· · · · · · · · · · · · · · · · · · ·		
				SHUTTLE CON	TENTS						
No	Type	Size	Preserv.	ANALYSIS	Fil	L (Y/N	SAMPLER  Observations	<del></del> c	LAB bservations		
	MET	1000	HNU3	METALS .		У	USED .45 MILTON	/			
1	CUN <b>S</b>	125	H2504	TOC/COD *		y	FIELD FILTER	/	<u></u>		
_1	CONS	1000	H2S04	NH3/TKN		У		N	*		
1	СПИП	125	NUNE	SOLIDS/TD •		N		1			
$\perp$											
		1									
-		:							<u></u>		
$\dashv$	-										
								<del> </del>			
		140		CHAIN OF CUSTODY	CHRONI	CLE					
_	Shutt	le Open	ed By: (pri	mike Zarensk	<u> </u>	Date		Time:	רובו		
1.	Signature: m. 200 - 3 arenagi						Seal #: [89 3 4 3 Intact:				
2.	I have received these materials in good condition from the Name:						above person. Signature:				
	Date: Time:					Remarks:					
3.	I have received these materials in good condition from the Name:					above person. Signature:					
	Date: Time:					Remarks:					
4.	Shutt	le Seale	d By: (prin	" mike Zarenski		Date	7111191	Time:	1055		
4.	Signa	ature: ^	nush	alone a S. Q. a		Seal	#:, 189344	Intact:	<u> </u>		

	ompai		) INDUST	RI-PLEX SITE		Attn :	: GOLDER ASS	SUDIATE	4/18
	ility/Si	INT		ON OF COMMERCE WAY		_ Phon	e: <u>(617) +38</u>	- 0930	<u> </u>
·	Addres	ss: <u>Ait</u>	ANTIC A	<u>NVENUE, WOBURN, MA</u>	01801	_			
				SAMPLE ID	ENTIFICATIO	N	·		
Faci	lity:	<u>0 ادا</u>	I L D I Facility/Si		- opti	(Optional S	Sample Point Descriptions	PKP	
		Source Co (from belo	de Yo	1 18 1A IM S 1 1 9 1  Our Sample Point ID (left justily)	Start Date (YY/MM/DD)		Start Time Etapsed (compo		
We	urce Code II (W) I (S)	Outfail					ollection Sys(C) Ott		
		207716		SHUTTLE	CONTENTS			·	
No	Туре	BOTTLE Size	Preserv.	ANALYSIS		Filt. (Y/N)	SAMPLER Observations	Ot	LAB
1	MET	1000	HNU3	METALS .		V	In lino	J	
	ÜÜNS	125	H2S04	TOC/COD •		У	4.14.5	V	i i
	CONS		H2504	NH3/TKN *		y	vs p d	V	1
	CLINU	125	NUNE	SOLIDS/TD .		N	45 MICTON	17	
	υтв	40	GC/MS		اشع سادهم		1 13 77 77 78		<del></del>
	0.0	<u> </u>	GC/113		bers q				
	_								
					<del></del> .	-	<u> </u>		
i				CHAIN OF CUS	TODY CHRO	NICLE			
1.	1		ed By: (pri	nt) Mike Zarenski	•	Date:	4 8 91	Time:	
••			Moder (			Seal #		Intact:	<u> </u>
^	Nam		ed these m	aterials'in good condition		ove pers Signatu			
2.	Date			Time:		Remarks	s:		,
	1		d these m	aterials in good condition					
3.	Nam	e:			<del></del>	Signatur	re:		<del></del>
	Date	:		Time:		Remarks	s:		<u>3</u> 5
4.	Shut	tle Seale	d By: (prin	1) melas Zare	nski	Date:	4111171	Time:	105
₹.	Sign	ature: 🔥	ر ولا سرد	() () ()		Seal	#:, 189344	Intact:	ί.

_			INDUST	RI-PLEX SITE		4440	GEU DER ASS	प्रात SUCIATES, INC
U	ompan	ıy: <u></u> _	1110051	RI-FLEX SITE				
Fac	ility/Sit	e:	FRSECTI	ON OF COMMERCI	E WAY &	Phon	e: <u>(617) 738</u>	- 0530
	Addres			VENUE, WOBURN				
				2011	PLE IDENTIFICATION	OM.		
		1		<u> </u>			0 21- 1	
	lity:		Facility/Si		MAYEIX SP			Ę
Sam	ple Po	int: X-		US Sample Point ID	Sign Daie		itart Time Elapsed I	Hours
Sa	urce Code	(from below		(left justify)	(YYIMM/DD)		00 hr. ctock) (compo	
We	it( <b>W</b> )	Outfall			ace (mpoundment (I)			
Sol	l(S)	River/Strea	m.(H) Gen		Iment Facility(T) UTTLE CONTENTS		(L) Spe	city
		OTTLE			<del></del>	1	SAMPLER	LAB
No	Туре	Size	Preserv.	ANAI	Lysis 	FH1. (Y/N)	Observations	Observations
_1	MET	<b>1</b> 0u0	HNU3	METALS /		У	. 45 micron	1
1	CUNS	125	H2S04	TOC/COD /		У	Filter used.	V
1	CONS	1000	H2S04	NH3/TKN /		У		V
	CUNU	125	NUNE	SOLIDS/TD /		N		
						<del> </del>		
					<del></del>	-		<u>                                     </u>
				The same district with the same	<del></del>			
			- A A	CHAIN O	F CUSTODY CHRO	ONICLE	<u></u>	<u> </u>
_	Shutt	le Open	ed By: (pri		A. WHEELER	Date:	910409	Time: 1335
1.	Signa	ature:		Stephin a. W		Seal #		Intact: YES
	Į.		d these m	aterials in good con				
2.	Name	9: <u>M</u> .1.	KY Z	arenski		Signatur	e: Nuchar	2 mandie
	Date		, <del>-</del>	Time: \\	& X	Remarks	S	J
	I have			aterials in good con	dition from the abo	ove pers	on.	
•	Name			•		Signatur		
3.	Date:	<del></del>		Time:		Remarks		357
			d By: (prin			Date:	41 (-	Time: 1750
4.		ature: /\	-	"MIK+ Zai	C C	Seal	111 (191	Intact: V
	Jugue	u.o/\	<u> Lehoi</u>	<u></u>	The service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the service of the se	<u> </u>	<u> </u>	<del></del>

C	ompar	ny: <u>C/C</u>	] INDUST	RI-PLEX SITE	Attn.:	GOLDER ASS	BOCIATES, INC
Fac	ility/Si	lo-			Phon	e: <u>(617) 938</u>	- 1531
	•	INT		ON OF COMMERCE WAY &		e. <u></u>	
	Addres	SS: H   L	HNIIC F	VENUE, WOBURN, MA (	1801_		·
				SAMPLE IDENT	FICATION	· · · · · · · · · · · · · · · · · · ·	
Faci	ility:	ا افا	Facility/\$	S R T L	(Optional )	Sample Point Descriptions	
Sam	ple Po	int: W- Source Co (from belo		iur Sample Point ID 5fia	rt Date S	41/15 Elapsed (compo	
	urce Code ili(W)	is: - Outfall	(O) Bott	om Sediment (B) Surface Impoundme	.,	offection Sys(C) Off	ner
Soi	il(\$)	River/Strea	ım(R) Gen	eration Point(G) Treatment Facility . SHUTTLE CO		(L) Spo	ecify
		BOTTLE	<u>-</u>			SAMPLER	LAB
No	Туре	Size	Preserv.	ANALYSIS	FIIL (Y/N)	Observations	Observation
_1	MET	1000	HNU3	METALS /	У У	45 MKRON .	V
1	CUNS	125	H2S04	10C/COD /	y_	FILTER 45ED	V
1	CONS	1000	H2S04	NH3ZTKN 🗸	у		1, +
1	CUNU	125	NUNE	SOLIDS/TD /	N		7
			<del></del>				
							<del> </del>
		<b>.</b>		OHAIN OF OUCTOR	Y CURONICI E		
	Shut	tle Open	ed By: (pri	CHAIN OF CUSTOD	Date	910409	Time: 1054
1.	Sign	ature:	Stu	A		145 1910	Intact: YES
			d these m	aterials in good condition from	· ·	./1/ //	0/,
2.	Nam	e: _ <i>_D</i> /	מוש	S. LEY	Signatui 	e A Hus	Englis
	Date	4/17	/21	Time: /4/5	Remarks	5.	
 3.	I hav Nam		d these m	aterials in good condition from	the above pers Signatur		
<b>J</b> .	Date			Time:	Remarks	s: <i>:</i>	35
_	Shut	tle Seale	d By: (ph)	MIDAND SILEY	Date:	4/17/21	Time: 153
4.			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, <u>, , , , , , , , , , , , , , , , , , </u>		<del></del>	. <del></del>

			ental Testing ication Corp.	ORIGINA	L		7 <u>&gt;&gt;/</u> ETCJ		
CH	AIN	OF CL	ISTODY	FORM (CC1)	Date Seale	ed	91/04/05	By: ^{iùil}	. له
С	ompar	ny: _ C/C	INDUST	RI-PLEX SITE		Attn.:	GOLDER AS	SUCIATE	ES, INC
Faci	ility/Sit	to:	A.		1	Phon	e: <u>(617) 938</u>	- 0530	 J
a c		INT	ERSECTI	ON OF COMMERCE WAY	& 01801	FIIOI	G		
	Addres	ss:	HNIIC F	WENUE, WOBURN, MA	01801				
				SAMPLE IDE	NTIFICATION		- w <u></u> .		
aci	lity:	ا ق	I L D I Facility/Si	SIRITI I	(O	ptional S	Sample Point Descriptions)		
Sam	ple Po	int: M- Source Co (from belo		419 1 9 1  our Sample Point ID (left justify)	Start Date (YY/MM/DD)	S	G 3 0 Elapsed 00 hr. ctocki (comp		
We	rce Code II(W) I(S)	Outfall River/Strea		om Sediment(B) Surface Impour eration Point(G) Treatment Faci	lity (T) Lake		ollection Sys(C) Ot		
		207716	-	SHUTTLE	CONTENTS			<del></del> -	
No	Туре	BOTTLE Size	Preserv.	ANALYSIS	Fil	It. (Y/N)	SAMPLER Observations	O	LAB bservations
	MET	1000	Ниü3	METALS .		Y	· 45 MILLON		
1	CUNS	125	H2SU4	TOC/COD *		У	FILTRE USED	1	,
1	CONS	1000	H2S04	NH3/TKN *		У			
1	CUNU	125	NONE	SOLIDS/TD .		۸		/	
								<u> </u>	
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		<u>.</u>		OUANI OF OUC	TORY OURON	ÓI E		<u> </u>	
	Shut	tle Open	ed By: (pri	CHAIN OF CUST		Date:	419191	Time:	1 4.
1.	1	ature: _V	سنفي	Mike Zarensi	1.	Seal #		intact:	<u>                                      </u>
	I hav	e receive	d these m	aterials in good condition t			on.		7
2.	Nam	e: 			Sig	natui	re:		<del></del>
	Date	:		Time:	Rer	mark:	s:		
	1		d these m	aterials in good condition f					
3.	Nam	e: 				natur	·e:	<u></u>	
	Date		····	Time:		mark			361
	Shut	tle Seale	d By: (prin	1) MIKE ZAKENSKI		Date: Şeal (	71/04/11	Time: Intact:	17\$5 YES
4.	1 _	ature: 🖍							

				FORM (CC1)	Date Dealed	91/04/05	-J
С	ompan	y:	INDUST	RI-PLEX SITE	Attn.	GOLDER ASS	OCIATES, INC
Fac	ility/Sit	e:				e: (617) 938	- 0530
		1111	ERSECTI ANTIC A	ON OF COMMERCE WAY & OVENUE, WOBURN, MA C	1801		
						1	
		1 (2, 1)	h i . De te	SAMPLE IDENTI			
Faci	-	_	Facility/Si			Sample Point Descriptions	
Sam	ple Po	Source Co	de Yo	,	t Date	61310 Lapsed	
Soc	rce Code	(from belois:	w)	(left justify) (YY/I	AM/DD) (24	00 hr. clock) (compo	-Site)
	H(W) I(S)	Outfalf River/Strea		om Sediment (B) Surface Impoundment eration Point (G) Treatment Facility .	• • • • • • • • • • • • • • • • • • • •	ollection Sys(C) Oth	ecify
_				SHUTTLE CO	NTENTS		
No	Type	Size	Preserv.	ANALYSIS	Fill. (Y/N)	SAMPLER Observations	LAB Observations
1	MET	1000	HNO3	METALS *	Y	·45 micron	
1	CUNS	125	H2S04	10C/C0D •	Y		
	CONS		H2S04	NH3/TKN ●	y	Clu	
					-   ·	filter	+,
1	CUNU	125	NUNE	SOLIDS/TD .	-   ~	used	<i>V</i>
	вти	40	GC/MS	TEMPERATURE •			
				· · · · · · · · · · · · · · · · · · ·			
			:				
			1				
لســــ	l			CHAIN OF CUSTOD	Y CHRONICLE		
1.	1		ed By: (pri	mike Zorens Ki	Date:	<u> </u>	Time: 105
		ature:	unhar		Seal f		Intact:
	I have		d these m	aterials in good condition from	the above pers Signatu		
2.		<del></del>	····				
	Date:			Time:	Remark	سبب <u>بروس بروس می دو در در در در در در در در در در در در در </u>	
	I have		d these m	aterials in good condition from	the above pers Signatu		
3.			<u> </u>			<del></del>	
	Date:			Time:	Remark		363
4.	Į.		d By: (prin	1) MIKE ZAKENSKI	Date:	71/94/1/	Time: 1705
<b>~</b> .	Signa	ature: ^	فصاعيه	Q Zarench	<b>Ş</b> eal	# 187352	Intact: Yes

		ental Testing ication Corp. ISTOD	Y FORM (CC1)	RIGINAL		93/9ETC。		6462
Compa	ny: <u> </u>	INDUS	TRI-PLEX SITE		Attn.:	GOLDER AS	SOCIATE	S, INC.
ility/S	ite:		ION OF COMMERCE		Phone	: <u>(617) 938</u>	- 0530	
Addre			ION OF CUMMERCE AVENUE, WOBURN,		801			
			SAMF	LE IDENTIF	ICATION			
lity:	<u> </u>	Facility/S	SIRITI		(Optional Si	ample Point Descriptions)		
nple Po		0 W - V		9110A Start O			d Hours posite)	
urce Cod ell(W) il(S)		. ,		ce Impoundment. ment Facility		liection Sys(C) O		
			SH	UTTLE CONT	TENTS		····•	
Туре	BOTTLE Size	Preserv.	ANAL	YSIS	Filt. (Y/N)	SAMPLER Observations	/Obi	LAB
MET	1000	HNO3	TOTAL METALS	•	N	***		
,,_,	1000	_11102	TOTAL TILTALS					
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		=						
Shut	ttle Onen	ed By: (nr	CHAIN O	F CUSTODY	CHRONICLE Date:		Time:	
Sign	ature: n	مبديمصد	int) Mike Zaren	<i>ډ</i> لاړ ر		4 18191 189319	Intact:	647 V
	ve receive		naterials in good con-	dition from t		n,		
Date	):		Time:		— Remarks	:		
I hav		d these m	naterials in good cond	dition from t	he above perso Signature		:	365
Date	):		Time:		Remarks	•		
Shut	tle Seale	d By: (prir	III mukezar	ens Ki	Date:	91/04/16	Time:	1450
Sign	ature: <u>M</u>	سحكامد	n Ameny	کر'	Seal #	188350	Intact:	YES
USE O	NLY Open		TEMP. °C	Date:	1	Time:	and 2	VE

	<u> </u>			· · · · · · · · · · · · · · · · · · ·		
Compa	any: <u> </u>	] INDUS	RI-PLEX SITE			
cility/S	ite:	FEDRECT	ON OF COMMERCE WA	Phone	e: (617) 938	- 0530
Addre			AVENUE, WOBURN, MA			
,			SAMPLE I	DENTIFICATION		
ility:	<u> </u>	DIL DI I	SIRITI	(Ontinnal 5	Sample Point Descriptions	
nple F		-0 M1-1	_	1104110 11 Start Date	itart Time Elapsec 00 hr. clock) (comp	
ource Co	Outfall				• •	ther ,
oil(S)	River/Stre	am(H) Ger		E CONTENTS	(L) Sr	HECITY AND AND AND AND AND AND AND AND AND AND
	BOTTLE		ANALYSIS		SAMPLER	LAB
Type	Size	Preserv.		FIIL (Y/N)	Observations	Observations
MET	1000	ни03	TOTAL METALS	N		
<u> </u>	<del> </del>	<del> </del>				
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1			-			
<u> </u>	1	<u>i</u>	CHAIN OF CIT	STODY CHRONICLE		
Shu	ittle Oper	ed By: (pri		0-4	419191	Time: (05)
1		hichas	mike Zaren	Seal #		Intact: 1/
	ve receiv		naterials in good condition	from the above pers	on.	
Dat			Time:	Remarks		
i ha		ed these m	naterials in good condition	from the above pers Signatur		£
Dat	e:		Time:	Remarks	s:	36
Shi	ittle Seale	ed By: (prir	"m 15 e Zaren	Date:	Osladly.	Time: \500

CH.	AIN			FORM (CC1)	Date Sealed	91/04/05	Зу: <u>ผ่ฟ</u>
C	ompai		INDUST	TRI-PLEX SITE	Attn.:	GOLDER ASS	SOCIATES, INC.
Faci	lity/Si	te:			Phone	e: <u>(617) 938</u>	- 053 <b>0</b>
,	Addre		-	ON OF COMMERCE WAY & AVENUE, WOBURN, MA 01	801		
•		· · · · · · · · · · · · · · · · · · ·		SAMPLE IDENTIF	ICATION		
acil	lity:	GIC	Facility/Si	SIRITI I	(Optional S	ample Point Descriptions)	
	ple Po	Source Co (from belo		SIGIAL I GILL Start E (YY/MM	Date S	51218 Lapsed (compo	
Wel	I(W) (\$)	Outfall		tom Sediment (B) Surface Impoundment. eration Point (G) Treatment Facility	* *	flection Sys(C) Off	ner
				SHUTTLE CON	TENTS		
No	Туре	BOTTLE Size	Preserv.	ANALYSIS	Fitt. (Y/N)	SAMPLER Observations	LAB Observations
,	MET	1000	HNO3	TOTAL METALS			7
•	116.1	1000	1,",0,5	TOTAL TIL TALS I	13		-
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				· ·			
	Shut	tle Onen	ed By: (pri	CHAIN OF CUSTODY	Dete	0	Time: \240
1.		ature:	-	TOPPO WHERE	<u>*                                    </u>	910409 :0189313	Intact: YES
2.	I hav Nam		ed these m	aterials in good condition from t	the above personatur		
	Date	):		Time:	Remarks	<b>:</b>	
3.	l hav Nam		d these m	aterials in good condition from t	he above perso Signatur	e: 	
	Date	:		Time:	Remarks	: 	369
4.	Shut	tle Seale	d By: (prin	TIETHEN A. WHERE	Date:	91/04/16	Time: 1605
₹.	Sign	ature:		TIES O. WRUS	Seal #	189314	Intact: Yes

UM	AIN (	or Cl	וטטופי	FORM (CC1)	Date Sealed.	91/04. <del>05</del>	By:աա
		C25	t though	rot picy SITE		- COUNTRY AS	EDCIATES 1
		•				n.: <u>GOLDER AS</u>	
Faci	ility/Sit	e: INT	ERSECTI	ON OF COMMERCE WAY &	Pho	one: <u>(617) 938</u>	- 0530
,	Addres	s: <u>ATL</u>	ANTIC A	NUENUE, WOBURN, MA	01301		
			· · · · · · · · · · · · · · · · · · ·	SAMPLE IDENT	IFICATION		
aci	lity:	<u>    []</u>	Facility(\$)	S  R  T    Less Code	(Option	al Sample Point Descriptions)	
		Source Co (from belo		our Sample Point ID St	rt Date	Start Time Elapsed (2400 hr. clock)	
Wel	rce Code II(W) I(S)	Outfall		om Sediment(B) Surface Impoundment eration Point(G) Treatment Facility	(T) Lake/Oce	Collection Sys. (C) Otean (L) Sp	
		OTTLE		SHUTTLE CO	NTENTS	SAMPLER	LAB
No	Type	Size	Preserv.	ANALYSIS	Filt. (Y	<del></del>	/ Observation
1	MET	1000	Ни:03	TOTAL METALS 7	N		
		2000		1011/2 1121112			
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	C E	1- 0	-45. 7	CHAIN OF CUSTOR			*:
1.	Signa	ie Openi	ea sy: ( <b>pri</b> i	mike Zarenski	Dat Sea	41017	Time:
				aterials in good condition from			intact. V
2.	Name		ы и <b>юзе</b> (II	arenais in 9000 countrion trot	Signa		
	Date:			Time:	Rema	rks:	
			d these m	aterials in good condition from			·
3.	Name	e: 			Signat	ture:	
	Date:			Time:	Rema	rks: <u>-</u>	3:
4	Shutt	le Seale	d By: (prin	" Mikpzarens	く。 Dat	e: 4/17/91	Time: $1 \phi S$
4.	Signa	ture:	uh	In Zounghi	<u>βea</u>	189344	Intact: y
يعبب		ILY Open		11 78 040 401 )-	nte: _4/18	Time:	455

C	ompan	y: <u>C/C</u>	INDUS	TRI-PLEX SITE		Attn.:	GOLDER ASS	OCIATES, IN
	lity/Site						(617) 938	
	•	INI	_	ION OF COMMERCI AVENUE, WOBURN		801		
				SAMI	PLE IDENTIF		· · · · · · · · · · · · · · · · · · ·	
Facil	lity:	] [دَا	) L O I Facility/S	S R T	IN A	十个、大 S	mple Point Descriptions	
		Source Co (from belo	ide Y	our Sample Point ID	Start C Start C YYYMM	Date Sta	int Time Elapsed I	
Wei	rce Codes	Outfall			ace Impoundment.		ection Sys(C) Oth	
501	(S)	River/Strea	im(R) Gai		UTTLE CON		(L) Spe	icity
<u> </u>		OTTLE		ANAI	LYSIS		SAMPLER	LAB
NO	Туре	Size	Preserv.			Filt. (Y/N)	Observations	Observatio
-1	MET	1000	<b>ELIMH</b>	TOTAL METALS	•	14		Ψ
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			S. S.					
	<u> </u>			CHAIN O	F CUSTODY	CHRONICLE		
1.			ed By: (pr	111(1)		Date:	<u>4 18 191</u> 189343	Intact:
				naterials in good con		<del></del>		
2.	Name			, <b>g</b>		Signature		
٤.	Date:			Time:		— Remarks:		
	•	receive	ed these m	naterials in good con	dition from t	<del></del>		
3.	Name		·			Signature		
J.	Date:			Time:		— Remarks:		37
	Shutt	e Seale	d By: (prir		arrns	∠ · Date:	4/17/21	Time: 19/s

_		C 20	THIS IST	at mrev ette		רטי אבם אני	SOCIATES -
С	ompar	1y: <u> </u>	INDUST	RI-PLEX SITE			BOCIATES, INC
Fac	ility/Si	te:	ERSECTU	ON OF COMMERCE WAY &	Phone	: (617) 958	- 0530
	Addres			VENUE, WOBURN, MA 018	301		
	-		<u>.</u>	SAMPLE IDENTIFIE	CATION		
Faci	lity:	ع اف	I L D II :	E R T	(Optional S	ample Point Descriptions	
		Source Co (from belo		ir Sample Point ID Start Da (Ver/MM/C	le Si	art Time Elapsed (compo	
We	urce Code	Outfall		m Sediment (B) Surface Impoundment		, , , , ,	ner
506	ii(S)	ruver/51fe8	m(M) Gene	ration Point(G) Treatment Facility SHUTTLE CONT		(L) Spe	surry
		BOTTLE		ANALYSIS		SAMPLER	LAB
No	Туре	Size	Preserv.	A11AL 1 010	FIIL (Y/N)	Observations	Observations
1	MET	1000	нии3	TOTAL METALS	N		/
							1
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		-					
i				CHAIN OF CUSTODY			
1.	i	•	ed By: (prin	DIEMEN V. MINES		910409	Time: 1054
		ature:	d these ==	Apple Of White Literal In good condition from the	Seal #	7803277	Intact: YES
•	Nam	e: _		•	e above perso Signatur	4/ /	when her
2.	Date		AVID S	. <i>LET</i> Time: 1425	— Remarks		1/-/-
		<del>//</del>	/ 7/		_		<u> </u>
3.	Nam		u mese ma	terials in good condition from th	Signatur Signatur		
	Date	: <u></u>	<u></u>	Time:	Remarks	:	374
4.	Shut	tle Seale	d By: (print	) DAYID S. LEY	Date:	4/17/91	Time:
↔.	Sign	ature: 🔏	11 6.1	-661	Seal #	1893+2	Intact: /55

						<del></del>	
C	ompar	y: C/C	INDUS	RI-PLEX SITE		GOLDER ASS	
Faci	lity/Sil	te:		ON OF COMMERCE WAY &	Phon	e: <u>(617) 938</u>	- 0930
4	∆ddres	INI S. ATL	ANTIC A	NUENUE, WOBURN, MA 01	18 <b>01</b>		
				<u> </u>	<del></del>		
		Le. c	1. 1 . 13. 1.	SAMPLE IDENTIF			
Facil	•		Facility/S	te Code	PUCATE (Optional S	Sample Point Descriptions)	<u> </u>
Sam	ple Po	int: X- Source Co	ide Y	40 10 10 10 10 Start (YY/M)	T / / S	613 0 Elapsed   Compo	
	rce Code	s: Outfall	(O) Bot	om Sediment (B) Surface Impoundment	(i) Leachate Co	ollection Sys(C) Oth	ner
	(S)	River/Strea		eration Point (G) Treatment Facility	(T) Lake/Ocean	(L) Spe	
				SHUTTLE CON	TENTS		<del></del>
No	Туре	Size	Preserv.	ANALYSIS	FIIL (Y/N)	SAMPLER Observations	) Observation
	MET	1000	HNU3	TOTAL METALS *	N		
-		1000	711105	TOTAL TILITALS			3
j							•
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	Shut	tle Onen	ed By: /pri	CHAIN OF CUSTODY	CHRONICLE Date:		Time: Ide
1.	Sign	ature: w	walka	mike Zarenski	Seal #	419191 : 189351	Intact: 5
·	1			aterials in good condition from			
2.	Nam			aterials in good condition from	Signatus		
	Date	•		Time:	Remark	s:	
	1		ed these m	aterials in good condition from			
3.	Nam	e: 			Signatui ——	'e:	
-	Date	•		Time:	Remarks	s: <del>-</del>	3.5
	Shut	tle Seale	d By: (prin	1) MIKE ZAKENSKI	Date:	91/14/17	Time: 1769
4.	Sign	ature: N	ricka (	2 Change	Søal i	\$ 018735Z	Intact: YES



ETC JOB#							
•	Sample Point W OW 212						
	Sattiple Point Source Code Sample Point I.D.						
\$9\$6. FIELD	PROCEDURES 0W-22 Mac 4/25/4/						
P 91110141119 PIGITIS	PSED HRS WATER VOL IN CASING VOLUME PURGED (Gallons)						
SAMPLING METHOD:							
Sampler Type  E A-Submersible Pump D-Dipper/I E-Baller C-Bladder Pump F-Scoop/S	X-Other						
Sampler Material D A-Teflon C-PVC D-Plastic	X-Other (SPECIFY OTHER)						
Tubing Material A-Teflon C-Polyeth	/lene X-Other SPECIFY OTHER)						
Sample Composited Y/10							
	Procedura/Proportions						
FIELD M	EASUREMENTS						
Well Elevation (ft/msl)	O Well Depth (ft) 1664						
Depth to Ground water (ft)	Sample Depth (non-well) (ft)						
Groundwater Elevation (ft msl)	lol also int						
VALUES ARE CO	DE INT						
1st 6 8 / (STD) 1st   Z /   Ø	wre/cm EH 166 mV value units						
2nd 6 - 8 1 (STO) 2nd 2 10 6	umicm EH GG MV at 25°C (other parameter) value units						
3rd (STD) 3rd	urn/cm at 25 °C (other parameter) value units						
4th (STD) 4th	at 25 °C (other parameter) value units						
	NTU (other parameter) value units						
Sample Temp Turbidity							
	COMMENTS						
Sample Appearance: Slightly Turbid	10000						
•	slow wind						
Other:	163 gal If+ 2"casing						
P. 15 e Vol = (16.64 - 9.0)	(63)(3) = 4.0						
· • • • • • • • • • • • • • • • • • • •	5.0 gallons						
This is a resumption d	reto broken bottles						
FILTERING: Use Chain of Custody (CC1) to	indicate which bottles were filtered						
Sampler: M. Kr Zarensk,	Employer: Golder Assoc.						
I certify that sampling procedures were in accordance	e with applicable EPA state and corporate protocols.						
4/18/91 mala O Zaiona	378						
(Date) (Signature)							



_	ETCJOB# <u>CA6448</u> CA 6673
	Sample Point W OWI-1510IA1 1 1   Source Code AL Sample Point I.D.
-	FIELD PROCEDURES MAL 4/25/41
	PURGE DATE START PURGE ELAPSED HRS WATER VOL. IN CASING (Gallons)  PURGE DATE (YY MM DD) (Gallons)  PURGE DATE (Gallons)
	SAMPLING METHOD:
•	Sampler Type  X A-Submersible Pump B-ISCO B-Baller C-Bledder Pump C-Scoop/Shovel  X-Other C-Scoop/Shovel
	Sampler Material X A-Teflon C-PVC D-Plastic X-Other Polyethylene
•	Tubing Material C A-Teflon B-Tygon C-Polyethylene D-Silicon X-Other
l	Sample Composited Y/
—نتع	Procedure/Proportions
7	FIELD MEASUREMENTS
ı	Well Elevation (ft/msl) Well Depth (ft) 30126
	Depth to Ground water (ft) 117187 Sample Depth (non-well) (ft)
	Groundwater Elevation (ft msl)
7	
-	1st 5 . 8 4 (STD) 1st 12 0 0 um/cm Eh 1st 5 1 mV units
7	2nd 5 , 8 6 (STD) 2nd Z 6 4 uniform EN 151 mY value units
7	3rd (STD) 3rd um/cm at 25°C (other parameter) value units
ı	4th see cond at 25°C (other parameter) value units
	ph epec. cond. (other parameter) value units
	FIELD COMMENTS
T	Sample Appearance: Ytll owish i no odor
I	Weather Conditions: Partly Sunny, 45° F Slight breeze
4	Other:
	Prige Volume = (30.26-12.87) (.652(3) = 34
	well not surveyed information not available
	652 gal/f+ 4"casiny
	FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
7	
	Sampler: M.K. P. Zarthski Employer: Golder Assoc.
7	I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
1	4 mucho Dane 380
ali.	(Date) (Signature)



Sample Point    Sample Point   Source Code   Service Point   Source Code   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Service Point   Ser	ETC JOB # _ CA 6420
SAMPLING METHOD:  Sampler Type E	Sample Point W OMINALLLL
SAMPLING METHOD:  Sampler Type E	FIELD PROCEDURES
Sampler Type    A Submersible Pump   E-Baller   Salier   Scoop/shove!   Salier   Scoop/shove!   Salier   Scoop/shove!   Salier   Scoop/shove!   Salier   Scoop/shove!   Salier   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/shove!   Scoop/sho	PURGE DATE START PURGE CA400 Hr Clock)  PURGE DATE (Gallons)  PURGE DATE (Gallons)  PURGE DATE (Gallons)  PURGE DATE (Gallons)
Sampler Type    BISCO   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!   Secondshove!	SAMPLING METHOD:
Sampler Material A B-Metal D-Plastic X-Other SPECIFY OTHER)  Turbing Material NA ATellon D-Sillion X-Other Superior OTHER)  Sample Composited NA Service D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other X-Other X-Other D-Sillion X-Other D-Sillion X-Other D-Sillion X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-Other X-O	Sampler Type E BISCO E-Baller X-Other
Sample Composited (N)  FIELD MEASUREMENTS  Well Elevation (tt/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)  1st	Sampler Material I 🖂   Pagest   Disease X-Other
Well Elevation (ft/msi)  Depth to Ground water (ft)  Groundwater Elevation (ft msi)  Depth to Ground water (ft)  Groundwater Elevation (ft msi)  1st	Tubing Material TN/A process person X-Other
FIELD MEASUREMENTS  Well Elevation (ft/msl) Depth to Ground water (ft) Groundwater Elevation (ft msl)  1st	
Well Elevation (ft/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)  1st   D	
2nd	Well Elevation (ft/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)    10554   Well Depth (ft)   1850
Sample Appearance:  Other:  TWASE CAN:  DETAIL OF WELL - DETAIL TO WATEX X. WEST CASING X 3 = PX CX  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler:  Sample Spec. cond.  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.	
Sample Appearance:    Clear Superior   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State	2nd lo 44 (STD) 2nd lo 80 stratem EH 304 low units
Sample Temp  Sample Temp  FIELD COMMENTS  Sample Appearance:  CLEAR SOME REDDICH BROWN MATTER  Weather Conditions:  SUMMY SUGHT BREFFE ~50°F  Other:  PURGE CALC: DEFIN OF WELL - DEFIN TO WATER X. 1652 (G21/F1 of 4" CROMP) x 3 = PLACE  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler:  [Print]  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  71/04/12  Stand Whith  314	3rd ard at 25°C
Sample Temp  Turbidity  FIELD COMMENTS  Sample Appearance:  CLEAR STME REDDICH BROWN MATTER  Weather Conditions:  SUMMY SIGHT BREFOR VIOLE  Other:  PURGE CALC: DETIN OF WELL - DETIN TO WATEX X. 1652 (G21/F1 of 4" CRONY) X 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4th (\$10) 4th at 25°C [ ]
Sample Appearance: CLEAR SIME REDDISH BROWN MATTER  Weather Conditions: SWANY SIGHT BREEZE VSOOF  Other:  PWGE CAC: DEFIN OF WELL - DEFIN TO WATER X . WS2 (G21/FL of 4" CRSNY) X 3 2  RURGE VOL.  40:50 - 7.00 = 41.44 X . 652 X 3 = EX.00  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: STENIEN A. WHEFIER Employer: GOLDER ASSOC. INC.  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Steph A. Whefier  314	
Sample Appearance: CLEAR SIME REDDISH BROWN MATTER  Weather Conditions: SWANY SIGHT BREEZE VSOOF  Other:  PWGE CAC: DEFIN OF WELL - DEFIN TO WATER X . WS2 (G21/FL of 4" CRSNY) X 3 2  RURGE VOL.  40:50 - 7.00 = 41.44 X . 652 X 3 = EX.00  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: STENIEN A. WHEFIER Employer: GOLDER ASSOC. INC.  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Steph A. Whefier  314	FIELD COMMENTS
Weather Conditions: SUNDY SIGHT BREEZE NSO'F  Other:  TWGE CAC: DEFIN OF WELL - DEFIN TO WATEX X WS (GOLFG of 4" CREMY) X 3 =   RURGE VOL.  48.50 - 7.010 = 41.44 X 652 X 3 = PLOC  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: STENED A. WHEFITER Employer: GOLDER ASSOCIAC  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Steph O. Whefite 314	A
Other:  TWIGE CALC: DEFIN OF WELL - DEFIN TO WATEX X. 652 (GOLFG of GOLDER X32  RUNGE VAL.  48.50 - 7.00 = 41.44 X. 652 X 3 = 64.04  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: State A. WHERTER Employer: GOLDER ASSOCIAC  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 State A. Wherter 314	
PURGE CALC: DEPTH OF WELL - DEPTH TO WATER X. 1652 (GRIFF of 4" CASING) X 3 = PLICAC  48.50 - 7.010 = 41.44 X. 1652 X 3 = PLICAC  FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: Storted A. WHERTER Employer: GOLDER ASSOCIAC.  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Storted A. Wherter 314	·
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: Stephen A. Wherever Employer: GOLDER ASSOCIAC.  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Steph A. Wherever 314	PARGE CALC: DEPTH OF WELL - DEPTH TO WATER X . W32 (GOLISS OF A" CASING) X 3 =
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered  Sampler: Steward A. Wherever Employer: GOLDRA ASSOCIATION  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Stepa O. Wherever 314	
Sampler: Steward A-WHERTER Employer: GOLDRE ASSOCIACE  I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/12 Stepa Q.WRidu 314	
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.	FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
91/04/12 Steph a. Wheeler 314	
91/04/12 Steph a. Wheeler 314	I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
	CLI GLODINO



ETCJOB# CA642/
Sample Point W W Source Code Sample Point LD.
FIELD PROCEDURES
PURGE DATE (1400 Hr Clock)  PURGE DATE (1400 Hr Clock)  START PURGE (2400 Hr Clock)  SAMPLING METHOD:
Sampler Type    A-Submersible Pump   D-Dipper/Bottle
Sampler Material A-Teflon C-PVC B-Metal D-Plastic X-Other
Tubing Material NA A-Teflon C-Polyethylene D-Silicon X-Other SPECIFY OTHERS
Sample Composited YN
FIELD MEASUREMENTS
Well Elevation (ft/msl) 5786 Well Depth (ft) 2632  Depth to Ground water (ft) 5168  Groundwater Elevation (ft msl) 5168
1st 6 - 7 5 (STD) 1st 17850 urn/cm EH 1-316 my
2nd 6 - 1   (SID) 2nd   1 8 5 0 at 25°C   E
3rd (STD) 3rd um/cm at 25°C (other parameter) value units
4th
Sample Temp Turbidity
FIELD COMMENTS
Sample Appearance: Brownish color Trang uder
Weather Conditions: $\frac{5}{2000} = 1000000000000000000000000000000000000$
DWIT is 4" diameter PVC well purged using dedicated
Began sampling at OPIS and stopped at choo decto feturated
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: Mibezarenska Employer: Galder
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols. 16
4/11/91 michael zonersa.



FIG.IOR# (AU)								
Sample Point Source Code Sample Point I.D.								
FIELD PROCEDURES								
Furge date Start purge (17 MM DD) (2400 Hr Clock) (Gallons) (Gallons) (Gallons)								
SAMPLING METHOD:								
Sampler Type  E  A-Submersible Pump D-Dipper/Bottle E-Bailer C-Bladder Pump F-Scoop/Shovel  SPECIFY OTHER)								
Sampler Material A Teflon C-PVC D-Plastic X-Other Recurry OTHER)								
Tubing Material A-Tellon C-Polyethylene D-Silicon X-Other SPECIFY OTHER)								
Sample Composited   YD								
Procedural Proportions .								
FIELD MEASUREMENTS								
Well Elevation (ft/msl) Well Depth (ft)								
Depth to Ground water (ft)  Sample Depth (non-well) (ft)								
Groundwater Elevation (ft msl)								
1st 5 - 9 4 (STD) 1st 150 um/cm EH 7 - 4 mv units								
2nd 5 - 9 5 (STD) 2nd   50 um/cm EH   224 mv								
ph apec.eond. (other parameter) value units								
ph spec. cond. at 25 °C (other parameter) value units								
4th spec. cond. um/cm at 25°C (other parameter) value units								
Sample Temp Turbidity								
FIELD COMMENTS								
Sample Appearance: 11237, 10 3 ad a r								
Weather Conditions: Sony 65°F 40 moh winds								
Other Equipment blank performed at CWIT, Purchased								
distilled water was run through a dispersable builer								
then I rouse unch to bottles, for filtered Parameters								
materials transferred from bailer to filtering vissel								
and filtered								
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered								
Sampler: MIKE Zarenski Employer: 5 alder								
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.								
4 101/91 Michael Zeneral 318								



ETC JOB# CA 4423
Sample Point W ON 38   1 1 1 Sample Point 1.D.
FIELD PROCEDURES
9,10,4,1,1
SAMPLING METHOD:
Sampler Type  E  A-Submersible Pump D-Dipper/Bottle E-Baller C-Bladder Pump F-Scoop/Shovel  SPECIFY OTHER)
Sampler Material A-Tetion C-PVC B-Metal D-Plastic X-Other (SPECIFY OTHER)
Tubing Material NA A-Tetion C-Polyethylene D-Silicon X-Other (SPECIFY OTHER)
Sample Composited YN Procedural Proportions
FIELD MEASUREMENTS
Well Elevation (ft/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)  Well Depth (ft)  Sample Depth (non-well) (ft)  U4141
1st
FIELD COMMENTS
Sample Appearance: REDDISH BROWN SUSPENDED MATTER
Weather Conditions: SULINY, VERY WINDY, 40° F
Other: TURGE VOLUME CALC WELL DEPTH - DEPTH TO WATOR X . 652 X 3
-652 gal ft of 4" casing
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELTR Employer: GOLDER ASSOC INC.
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
910412 Stephin While  (Date) Segneture)  320



ETC JOB#
Sample Point Source Code Sample Point LU.
FIELD PROCEDURES
PURGE DATE START PURGE ELAPSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)  PURGE DATE (TY MM DD) (Gallons)
SAMPLING METHOD:
Sampler Type    E   A-Submersible Pump D-Dipper/Bottle
Sampler Material A-Teflon C-PVC
Tubing Material A-Teflon C-Polyethylene X-Other SPECIFY OTHER)
Sample Composited YN
Procedure/Proportions Procedure/Proportions
FIELD MEASUREMENTS
Well Elevation (ft/msl) * Well Depth (ft) 4 6 0
Depth to Ground water (ft) Sample Depth (non-well) (I1)
Groundwater Elevation (ft msl)★
1st 518 4 (STD) 1st 1200 um/cm EH 170 m/spec. cond. (other parameter) value units
2nd 585 (STD) 2nd 1200 um/cm EU (other parameter) value units
3rd um/cm spec. cond. st 25°C (other parameter) value units
4th ph (STD) 4th um/cm at 25°C (other parameter) value units
Sample Temp Turbidity
FIELD COMMENTS
Sample Appearance: CLONDY, Some Suspended Particles
Weather Conditions: Sunny, VERY WILLDY, COLD 40°F
Other: THREE YOL CALC - WELL DENTH - DENTH TO WATER & USS (GI) IT of 4"
(25) x 3 = 46.0-7.7=38.30 x.1652 x 3=74.91
half plant and also
Well elevation not surveyed, elevation unknown.
FU TERMO, the Obein of Custody (OOI) to indicate which bettles were differed
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHERER Employer: GOLDER ASSOC INC.
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
910412 Signature C. Wheel



ETC JOB#
Sample Point W DIWABIALLI L.
FIELD PROCEDURES
PURGE DATE START PURGE ELAPSED HRS WATER VOL IN CASING VOLUME PURGED (Gallons)  SAMPLING METHOD:
Sampler Type  E  A-Submersible Pump D-Dipper/Bottle E-Bailer C-Bladder Pump F-Scoop/Shovel S-PECIFY OTHER)
Sampler Material A Tellon C-PVC - GPECIFY OTHER)  A-Tellon B-Metal D-Plastic X-Other GPECIFY OTHER)
Tubing Material A-Teflon C-Polyethylene X-Other SPECIFY OTHER
Sample Composited YN
Procedure/Proportions  EICL D. 44E 4 CLID CALCALTO
FIELD MEASUREMENTS
Well Elevation (ft/msl) * Well Depth (ft) 2 50
Depth to Ground water (ft)  Groundwater Elevation (ft msl)  Sample Depth (non-well) (ft)
* WELL NOT SUNVEYED INFORMATION WHAVAILABLE
1st 5 0 6 3 (STD) 1st 12 2 5 0 um/cm EH 25 7 m/
2nd 5 163 (STD) 2nd 2250 um/cm EH 250 m/
3rd   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm   um/cm
4th   (STD) 4th   um/cm at 25°C (other parameter) value units
Sample Temp Turbidity
FIELD COMMENTS
Sample Appearance: CLousy
Weather Conditions: SUNKY VERY WINDY 40°F
Other:
PURGE VOL CALC: DEPTH OF WELL - DEPTH TO WATER X 1652 (GAT IT of 4" CASING)  X 3 : PURGE VOLUMED
26.50-7.31= 19.19 x.652 x 3 = 37.54
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELER Employer: GOLDER ASSOC INC
I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.
91/04/12 Signatural Signatural

Ch			ental Testing ication Corp. ISTODY	FORM (CC1)	GINAL Date Se	aled	91/04/05 B	ma	<del>-</del>
C	Compar	ny: <u>C/C</u>	INDUST	RI-PLEX SITE		_ Attn.:	GOLDER ASS	4/15/ OCIATES, INC	-7
Fac	:ility/Si	te:	_			_ Phone	e: (617) 938 ·	- U530	
		INT		ON OF COMMERCE I					
					E IDENTIFICATIO	N		· .	
— Fac	ility:	[6]0	I L D 1				P. Ke		-
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So	ii(\$)	River/Strea	m.,(R) Gen	<del></del>	TLE CONTENTS	ske/Ocean	(L) Spe	city	
No	Туре	BOTTLE Size	Preserv.	ANALYS	sis	Filt. (Y/N)	SAMPLER Observations	LAB Observation	\$
_1_	MET	<b>1</b> 0មប	HNU3	METALS *			QED model	V	
_ 1	CUNS	125	H2S04	10C/COD *			FF 8200	V	
1	CONS	1000	H2S04	NH3/TKN *			field Filter	VI	
1	E::NL	125	NUNE	SOLIDS/TD 5			used	1	
1	итв	4 ti	GC/MS	<u> </u>	huttle was				
		-	,	\	opened				
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				- <del> </del>	· · · ·				
	Ch. A	tin Orac	ad Don (au)		CUSTODY CHRO			Timai	
1.	}	-	ed By: (pri المحكمون	With Facel	ns.Ki	Date: Seal#	<u> </u>	Time: 1766 Intact: (	
		e receive		aterials in good condit		-	on.	7	
2.			······································	Time:		Ū			
	Date		d these m	aterials in good condit		Remarks			
3.	Nam					Signatur			
	Date			Time:	F	Remarks	»:		
4.	Shut	tle Seale	d By: (prin	"mike Zare	nski'	Date:	7112191	Time:	6
4.	Signa	ature:	بيجهم	Po 2 avenali	2	- Seal	189 32 6	Intact:	

			ental Testing ication Corp. ISTODY	FORM (CC1) ORIGINAL Date	e Sealed	91/04/05 B	CA6428
							y: idill ms u/15/4/
С	ompar	ıy: <u>C/</u> L	INDUST	RI-PLEX SITE	Attn.:	GOLDER ASS	OCIATES, INC.
Fac	ility/Sit	le:			Phone	e: <u>(617) 938</u>	- 0530
	Addres			ON OF COMMERCE WAY & AVENUE, WOBURN, MA 0180	1		
				SAMPLE IDENTIFICA	TION	<del></del>	· · · · · · · · · · · · · · · · · · ·
Faci	lity:	l si c	L D I	1 1	SYKE	DIAPLICATE	<u> </u>
	-			BIAIMSDI 1 1 911 10141	(Optional S	ample Point Descriptions	. !
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	irce Code	<b>!</b> \$:			(0	945) mi	4/16/9)
	∦ , ,{ <b>W</b> } ∦ , ,, <b>(S)</b>	Outfall River/Strea		om Sediment (B) Surface Impoundment ( eration Point (G) Treatment Facility(1		illection Sys(C) Othe (L) Spe	city
		BOTTLE		SHUTTLE CONTER	ŧTS	SAMPLER	1.45
No	Type	Size	Preserv.	ANALYSIS	Filt. (Y/N)	Observations	LAB Observations
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	CLINS		H2504		1		V
				TOC/COD *	7	FF 8300 WITH	v
_1	LUNS	<b>10</b> 00	H2S04	NH3/TKN		.45 MICRON FILT	<b>3</b>
_1	C: INU	125	NUNE	SOLIDS/TD .	N		<del> </del>
		1					
		1		Note: Seal # was			
				193997			
$\exists$							
				CHAIN OF CUSTODY CH	IRONICLE	<u> </u>	
1.			ed By: (pri		Date:	7 1-11-11	Time: 1169
<u>''</u>			سكلمه	2 Zovenski	Seal #		Intact: y
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2.					-		
	Date:			Time:	Remarks	): 	
	I have		d these m	aterials in good condition from the	above persi Signatur		
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	Date:			Time:	Remarks	S:	<u></u>
	Shuttle Sealed By: (print) mike Zarens &					9/12/91	Time:  400
4.	4	ature: M			Seal #	193998	

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C	ompar	ny: <u>    C∠</u> [	INDUST	RI-PLEX SITE		: GOLDER ASS	,	i, INU.
aci	ility/Si	te: 	ERSECTI	ON OF COMMERCE WAY &	Phor	e: (617) 938	- 0530	
-	Addres	ss: <u>ATL</u>	ANTIC A	NOBURN, MA	01801			
			<del></del>	SAMPLE IDENT	IFICATION			
am Sou	lity: ple Po irce Code ii(W)	Source Co	·w]	OL L Sample Point ID St	0 4 1 2  [] arl Date rmm(DD) (24	Sample Point Descriptions)  A C	site)	(X)
	i (S)	River/Stree		eration Point (G) Treatment Facility	(T) LakerOcean	1(L) Sp		
	. 1	BOTTLE		SHUTTLE CO	MIENIS	SAMPLER		LAB
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1	ати	40	GC/MS	TEMPERATURE when 5	hotle			
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<u>.                                    </u>	Shut	tle Open	ed By: (pri	CHAIN OF CUSTOI mille Zatenski	DY CHRONICLE Date:	4 18/91	Time:	1657
1.	Signa	ature: <u> </u>	uesiai	O Zarensiii	Seal	#: 189323	Intact:	<u> </u>
2.	i hav Nam		ed these m	aterials in good condition from	n the above pers Signatu			
	Date	:		Time:	Remark	s:		
3.	I hav Nam		ed these m	aterials in good condition from	n the above pers Signatu			
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١.		tle Seale ature:	d By: (prin	IN INF TOLEN SUL	Date Şeal	4 115 1911	Time:	1 + 45

	Environme	ntal Testing cation Corp.	Se	eal No. <u>/</u>	89321 ETC J	ob# <u>CA6429</u>
			FORM (CC1) DE	ate Sealed	91/04/05	By:ผ่ฟ
Company	r: C/D	INDUST	RI-PLEX SITE	At	tn.: GOLDER ASS	SUCIATES, INC.
				Dh.	one: (617) 938	- 8530
acility/Site	INT		ON OF COMMERCE WAY &		one <u></u>	
Address	: <u> </u>	ANTIC P	NVENUE, WOBURN, MA. 018	01		
			SAMPLE IDENTIFIC	CATION		
acility:	<u>ច្</u> រ ប្	L D I	SIRITI I	(Ontio	nal Sample Point Descriptions)	· '
ample Poir		0 W 1 - 1		ا لعللا		
	Outfall River/Strear		om Sediment (B) Surface Impoundment			nerecıly
	DET: -		SHUTTLE CONTI	ENTS	11	
io Type	Size	Preserv.	ANALYSIS	Filt. (1	SAMPLER (N) Observations	LAB Observations
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1 CUNU	125	NUNE	SOLIDS/TD /	N	FF 8200 used	/
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			•. 9			
		-1	CHAIN OF CUSTODY (	CHRONICL	.E	<u> </u>
Shuttle 1. Signat	•	ed By: (pri	STEAR A WHERE P		te: 910409	Intact: YIS
I have Name:		d these m	aterials in good condition from th	e above pe Signa		
Date:	,		Time:	– Rema	rks:	
I have Name:		d these m	aterials in good condition from th	e above pe Signa		
Date:_			Time:	_ Rema	nrks:	<u></u>
	e Sealed	i By: (prin	1) STEAREN A. WHEELER		te: 91 04/16	Time: 455
Shuttle 4. Signat	ure:		a strip. Whom.	' i Se	41#: <i>\BH 382</i>	Intact: Yes

			ental Testing ication Corp. ISTODY	FORM (CC1)		,	<u>932 </u> ETCJc 91/04/05 E		
<u> </u>	ompar	ny; <u>C</u> /2	TRUUNI O	RI-PLEX SITE		_ Attn.:	GOLDER ASS	OCIATES, INC.	
	•	-				Ohoo	e: (61 <b>7)</b> 938	_ N53N	
	ility/Sii Addres	INT		ON OF COMMERCE WAY VENUE, WOBURN, MA	& 01801	_ Phone _	<u> </u>	0,7,2,0	
				SAMPLE IDE	TIFICATIO	N			
aci	lity:	<u> 61 C</u>	I L D II Facility/Srt	SIRITI DUDI	cate	2 O C	amble Point Descriptions)		
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		į		CHAIN OF CUST	UDA CHBU	NICLE		<del></del>	
	Shutt	tle Open	ed By: (prir			Date:	910409	Time: 1113	
1.	Signa	ature:		Stephen Q. Whale		_ Seal#		Intact: YES	
2.	I have		d these ma	aterials in good condition from		ve pers Signatui			
	Date:			Time:		Remarks:			
3.	I have		d these ma	aterials in good condition fro		ve pers Signatur			
<b>J</b> .	Date:			Time:	<del> </del>	Remarks	3:		
	Shutt	le Seale	d By: (print	) STEPHEN A. WHE	GLER_	Date:	91/04/16	Time: \455	
4									

			ental Testing icution Corp. ISTOD Y	ORIGINAL / FORM (CC1)			93/9 ETC Jo	•
C	ompan	y: <u> </u>	INDUST	TRI-PLEX SITE		_ Attn.:	GÜLDER ASS	OCIATES, INC.
Fac	ility/Sit	e:	FOOFOR	194 OF 1994/FFIGE 1444 A		_ Phon	e: <u>(617) 938</u>	- 0530
	Addres			ON OF COMMERCE WAY & AVENUE, WOBURN, MA	01801	<del>-</del>		·
				SAMPLE IDENT	IFICATIO	N		
	lity:		L D I			(Optional)	Sample Point Descriptions)	
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			<del></del>	CHAIN OF CUSTO	DY CHRO	NICLE		<u> </u>
_	Shutt	le Open	ed By: (pri	nt) mike Zarenski	<u> </u>	Date:	418191	Time: 1647
1.	Signa	iture: <u>M</u>	<u>willow</u> (	Zownale		Seal #	!: <u>1893 19</u>	Intact: Y
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	Shutt	le Seale	d By: (prin	1) m. 1/2 7 a = a = 1/4 ·		Date:	91/01/11	Time: 145d
4.	1		سنجام	Mike Zarenski		Sept	71104116	intact: Yes
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			ental Testing ication Corp.  JSTODY	FORM (CC1) Da	te Sealed	91/04/05	3y:	d
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	ility <i>i</i> Si Addre	INT		ON DF COMMERCE WAY & VENUE, WOBURN, MA 0181		(617) 938	<u>- 0530</u>	1
				SAMPLE IDENTIFIC	ATION	··· -···		
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				CHAIN OF CUSTODY C	HRONICLE	<del></del>		
1.	Į.		ed By: (pri صدانص	nt) Mike Zarenski	Date: Seal#:	4 9 9 9 7	Time: Intact:	1169
2.	I hav		ed these m	aterials in good condition from the	above perso Signature			
	Date	:		Time:	Remarks			
3.	I hav		ed these m	aterials in good condition from the	above perso Signature			
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	Shut	tle Seale	d By: (prin	mile Zarenski	Date:	4/12/91	Time:	1400

C	ompa	ny: <u>_ C∠′C</u>	] INDUS	RI-PLEX SITE			
Fac	ility/Si	ite:	FRSECTI	ON OF COMMERCE WAY &	Phone	e: (617) 938	0530
	Addre			AVENUE, WOBURN, MA 0	1801		•
				SAMPLE IDENTI	FICATION		
Fac	ility:	<u>GLC</u>	I DI II	SIRITI E Gode	P MI PR +	Plan K	
San	iple Po		OHE	GIPI 1114 Dur Sample Point ID Stai	1 Date S	4 0 0	
	urce Cod	es:			0411 Ma	4/12/11	
	il (W) il (S)	Outlail River/Strea				(L) Sp	ecify
		BOTTLE		SHUTTLE CO	NTENTS	SAMPLER	LAB
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	Shui	itle Open	ed By: (pri	CHAIN OF CUSTOD	Date:	910409	Time: 1/25
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4.		-	и ву. (рин Илс. Руси	THINK TULLIN	Seal f	<u>411191</u> *: !9399_	Time: 16 4.5 Intact: V
	7.8"		"I'C'YO'	a. Heister	14/10	107	7547

	ompa ility/Si	te:		ON OF COMMERCE WAY &		GOLDER AS:		
	Addre				301			
			<del>-</del> -	SAMPLE IDENTIFI	CATION			
aci	lity:	<u> </u>	LD 1	SIRITII	(Optional Sa	imple Point Descriptions)		
	ple .Po	Source Co (from belo		BI 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		art Time I fir. clock)  Elapset		
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1.	1	ature: _W		Mike Zarenski	Seal #:	<u> 189315</u>	Intact:	<u> 1628 -</u> V
•		e receive	****	aterials in good condition from the	ne above perso Signature	n.		7
2.	Date			Time:	— Remarks:	<u></u>		
	I hav	e receive	d these m	aterials in good condition from the	ne above perso	n.		
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,	Shut	tle Seale	d By: (prin	mike 7 arenski	Date:	4 12 91	Time:	1815
4.	Sign	ature: (	nelos	2 Zanama Agi	Seal #		Intact:	У
LAB	USE O	NLY Open	ed Bv:	A. Sterolloate:	4/15/4	?/Time:	120	()

			ental Testing ication Corp.	ORIGINAL ORIGINAL					CA6456
CH.	AIN	OF CL	וטטופנ	FORM (CC1)	Date Seal	led	91/04/ <u>0</u> 5	_By:	iilld Ma
	-	<b>—</b>					· · · · · · · · · · · · · · · · · · ·		4/15/
C	ompar	าy: <u> C / ር</u>	INDUST	TRI-PLEX SITE		Attn.:	GOLDER AS	SOC 14	ATES, INC.
Faci	lity/Si	te:				Phone	(617) 938	3 <b>–</b> US	530
	Addros			ION OF COMMERCE WAY & AVENUE, WOBURN, MA	01801				
	audie:	35		TOCHOC, WODOKII, THE	01001				
				SAMPLE IDEN					
Facil	lity:	<u> 6</u> 0	L D I	SIRITI Mate	1x S P	He Optional Sa	mple Point Descriptions)		
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		Source Co	de Y	our Sample Point ID S	tart Date YIMMIDD)	(2400	hr. clockly (con	ed Hours	
	rce Code		20\ B-4	tom Sediment (B) Surface Impoundm	and di las		145) mu	4/14	•/1/
	(W)(S)	Outfall River/Strea					(L)	Other Specify	
				SHUTTLE CO	ONTENTS				
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	Date			Time:		marks:			
4.	Shut	tle Seale	d By: (prin	" mike Zarenski		Date:	4/12/91	Time 	
٠.	Signa	ature: M	edar	2 Zazonalij		Seal #:	189326	Inta	ct:
			ed By:	1 July 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ate:4	-115	[4] Time	7.	- W/-



	ETC JOB#
	Sample Point W OW-1416 1 1
FIELD PRO	OCEDURES
PURGE DATE START PURGE ELAPSE	D HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)
SAMPLING METHOD:	
Sampler Type  E A-Submersible Pump D-Dipper/Bott E-Bailer C-Bladder Pump C-Bradder Pump D-Dipper/Bott	X-Other
Sampler Material A-Tellon C-PVC B-Metal D-Plastic	X-Other
Tubing Material NA A-Teflon C-Polyethylen B-Tygon D-Silicon	e X-Other
Sample Composited YN	
	Procedure/Proportions
FIELD MEA	SUREMENTS
Well Elevation (ft/msl)	Well Depth (ft)     11315
Depth to Ground water (ft)	Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)	
FIELD PARAMETERS OBTAINED AFTER SAN	PLING EVENT DUE TO EQUIPMENT PROBLEMS
	form EH   8   mV   write
	/cm EH 84 mV
	/cm /5°C (other parameter) value units
AAL I I I I PETIN AAL I I I I I	/cm /5°C (other parameter) value units
Sample Temp	ιτυ
FIELD CO	DMMENTS
Sample Appearance: Slightly Turbid	no odor
Weather Conditions: Sunny , 50° F Ca	
Other: Well developed from 415/91	-> 4/12/91, 32gallons removed
* Information not Available u	vell not surveyed.
4" diameter well =	: .6529a1/f+
Purge Volume = (13.5)	-3,76)(.652)(3) = 19.05gollons
Well purged dry and was all	owed to recover before sampling
FILTERING: Use Chain of Custody (CC1) to in	dicate which bottles were filtered
Sampler: MIKY Zarenshi	
I certify that sampling procedures were in accordance	with applicable EPA state and corporate protocols.
Alla 191 michan Zananasu:	332



Г	ETC. JOB# CAG430
	1V1 1= 1
	Sample Point Source Code Sample Point I.D.
FIELD PI	ROCEDURES
निर्माक्षितागरी विश्वादाय नि	16.1315 LITHE > Dry
PARGE DATE START PURGE (TY MM DD) START PURGE (2400 Hr Clock)	SED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons) (Gallons)
SAMPLING METHOD:	
Sampler Type  E A-Submersible Pump D-Dipper/Bo E-Baller C-Bladder Pump F-Scoop/Sho	X-Other
Sampler Material A-Teflon C-PVC B-Metal D-Plastic	X-Other
Tubing Material NA A-Teflon C-Polyethyle D-Silicon	<del>-</del>
Sample Composited YM	(or corn orner)
oumple composited [1][V]	Procedure/Proportions
FIELD ME	ASUREMENTS
Well Elevation (ft/msl)	Well Depth (ft)
Depth to Ground water (ft)	6 Sample Depth (non-well) (ft)
Groundwater Elevation (ft msl)*	
FIELD DAG	
FIELD PARAMETERS OBTAINED AFTER SAM	WILLIAM THE TO EQUIMENT PROBLEMS
	m/cm E H Value units
	m/cm EH 129 mV 125°C (other parameter) value units
	im/cm t 25°C (other parameter) value units
	125°C
ph spec. cond.	(other parameter) value units
Sample Temp Turbidity	·
4	COMMENTS
Sample Appearance: Sightly Turbid	
Weather Conditions: Suny, 50°F Cale Other: This is a diplicate So	mple from ow-46 taken
1mmediately After sampling	
·	ny device
Purae Volume = (13.5 - 3.76)	(.652)(3) = 19.05 gellons
Well Purged dry after 7.1	
FILTERING: Use Chain of Custody (CC1) to in	ndicate which bottles were filtered
Sampler: Mike Zarenski	Employer: Golder Ass
I certify that sampling procedures were in accordance	with applicable EPA state and corporate protocols.
All6/91 michael Zavanshi	-



ETC JOB#
Sample Point W O W 19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
FIELD PROCEDURES
PURGE DATE START PURGE ELAPSED HRS WATER VOL. IN CASING VOLUME PURGED (Gallons)  PURGE DATE (TY MM DD) 12400 H; Clock)  PURGE DATE (Gallons)
SAMPLING METHOD:
Sampler Type    E   A-Submersible Pump   D-Dipper/Bottle   E-Baller   X-Other
Sampler Material A A-Teflon C-PVC D-Plastic X-Other SPECIFY OTHER!
Tubing Material A-Teflon C-Polyethylene X-Other SPECIFY OTHER)
Sample Composited YN
Procedure/Proportions  FIELD MEASUREMENTS
Well Elevation (ft/msl)  Depth to Ground water (ft)  Groundwater Elevation (ft msl)  Vell Elevation (ft/msl)  Sample Depth (non-well) (ft)  Sample Depth (non-well) (ft)
1st   980 um/cm at 25°C   E H   150 m V units  2nd   657D) 2nd   980 um/cm at 25°C (other parameter) value units  3rd   ph   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spec. cond.   spe
4th (STD) 4th at 25°C (other parameter) value units    G   (°C)   NTU   Sample Temp   Turbidity
FIELD COMMENTS
Sample Appearance: Reddish Color, Slight odor
Weather Conditions: SWNNY SUGHT BYEER A 56 F
Other field Parameters recorded after 7.48 gallons 1 ft3 sampling due to meter Pioblems h= water ratumn
Purge Volume = Tr2h.7.48 = 168 gallons
Well Purged dry @ 310 gallons
Puraed with Submersible Pump
FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered
Sampler: STEPHEN A. WHEELER Employer: GOLDER, ASSOC, INC
certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.  91/04/16 Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charles Charl

# APPENDIX F CLP Data Validation Narrative

# INDUSTRI-PLEX SITE ARSENIC PIT/CHROMIUM LAGOON GROUNDWATER INVESTIGATION

#### CLP Data Validation Narrative

#### 1.0 INTRODUCTION

Inc. (Golder) has performed a data Golder Associates Inorganic analytical data from validation of the observation well samples collected from April 11 through 18, 1991 at the Industri-Plex Site in Woburn, Massachusetts. These samples were collected for the Arsenic Pit/Chromium Lagoon Groundwater Investigation conducted as part of the Pre-Design Investigation (PDI) at the Site. The samples were analyzed for the Metals portion of the Inorganic Target Analyte List (TAL) in accordance with the Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) dated 7/88. The analyses were performed by Environmental Testing and Certification (ETC) Corp. of Edison, New Jersey (referred to as Laboratory). Both filtered and unfiltered samples were collected from twenty-two (22) primary locations to analyze for dissolved metals and total metals, respectively. locations were sampled in duplicate yielding four (4) Field Duplicate samples (2 filtered and 2 unfiltered). Extra sample volume was collected from two (2) of the primary locations to obtain sufficient sample volumes to perform the analysis of the Matrix Spike/Matrix Spike Duplicate (MS/MSD) pairs. The sample points are summarized in Table 1.

Data Validation was performed in accordance with the U.S. Environmental Protection Agency (USEPA) Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (June 13, 1988 and modified February 1989). In addition, the Data Validation criteria from the Quality Assurance Project Plan (QAPjP) for the PDI were followed. When differing guidelines were encountered, the data validator used the more conservative (stricter) guideline. Data qualifiers are defined in Table 2.

The Laboratory had been provided with the quality control (QC) criteria set forth in the QAPjP and was to have prepared and analyzed Matrix Spike Duplicate (MSD) samples and Duplicate Control Samples (DCS). Although sufficient sample volume was collected to perform the MSD analysis, Laboratory analysts followed the 7/88 SOW and performed Sample analysis rather Duplicate than MSD analysis. Additionally, the Laboratory analyzed Laboratory Control Samples (LCS) at the frequency specified within the 7/88 SOW. However, the analysis of the DCS pairs was not performed. Although some of these additional QC samples specified within the QAPjP were not analyzed, the Laboratory did follow the 7/88 SOW and performed analysis of all QC samples specified therein.

#### 2.4 Blanks

In evaluating the contaminants in the laboratory preparation blanks (PBW), the Initial Calibration Blanks (ICB), and the Continuing Calibration Blanks (CCB), the data validator determined the appropriate action levels (as specified in the USEPA Region I Data Validation Guidelines) from the associated blank having the highest level of contamination and applied these action levels to all of the associated samples within the analytical sequence. In evaluating the contaminants in the field blanks, the data validator applied the results from the filtered field blanks to the filtered samples and the results from the unfiltered field blanks to the unfiltered samples. When the same contaminant was present in the field blank as in the preparation and/or analysis blanks, the highest level of contamination was used to determine the action level.

Please note that sample volumes and dilution factors have been taken into consideration when applying the appropriate blank action levels to the samples.

Various contaminants were detected in the blanks analyzed with the filtered samples reported in SDG 000600. Potassium, Arsenic, Iron, Copper and Manganese were detected in the laboratory blanks at negative absorbances thereby causing sample results which may have been negatively influenced. non-detected results for these analytes required qualification as estimated detection limits. The positive these analytes required qualification as lues. Aluminum, Lead, Barium, Beryllium, results for estimated values. Calcium, Iron, Magnesium, Sodium, Zinc, Arsenic, Manganese and Mercury were detected at various concentrations in the laboratory and/or field blanks. Action levels were for each analyte. determined Positive results in the filtered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

Various contaminants were detected in the blanks analyzed with the unfiltered samples reported in SDG 000600. Potassium, Arsenic, Iron, Copper and Manganese were detected in the laboratory blanks at negative absorbances thereby causing sample results which may have been negatively influenced. The non-detected results for these analytes required qualification as estimated detection limits. The positive results for these analytes required qualification as estimated values. Aluminum, Barium, Beryllium, Calcium, Iron, Magnesium, Sodium, Zinc and Arsenic were detected at various concentrations in the laboratory and/or field blanks. Action levels were determined for each analyte. Positive results in the unfiltered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

which may have been negatively influenced. The non-detected results for these analytes required qualification as estimated detection limits. The positive results for these analytes required qualification as estimated values. Aluminum, Zinc, Calcium, Iron, Potassium, Copper and Arsenic were detected at various concentrations in the laboratory and/or field blanks. Action levels were determined for each analyte. Positive results in the unfiltered samples greater than the IDL, but less than the action levels, required qualification as undetected at the concentrations originally reported.

#### 2.5 ICP Interference Check Sample

The concentrations of Dissolved Calcium and/or Dissolved Iron in samples OW-17, OW-48A and OW-40 (SDG 000600) were greater than 50% of their respective levels in the Interference Check Samples (ICSA). These concentrations produced suspected positive interferences with Barium, Beryllium, Manganese, Potassium, Sodium, Vanadium and Zinc. Positive results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification as estimated values (J). The concentration of Dissolved Sodium in sample OW-17 was significantly greater than the interference level and did qualification. The concentration levels of Dissolved Calcium and/or Dissolved Iron also produced suspected negative interferences with Antimony and Cadmium. Positive results for these analytes required qualification as estimated values Non-detected results for these analytes required qualification as estimated detection limits (UJ).

The concentrations of Total Calcium and/or Total Iron in samples OW-17, OW-48A and OW-40 (SDG 000600) were greater than 50% of their respective levels in the Interference Check These concentrations produced suspected Samples (ICSA). positive interferences with Barium, Beryllium, Copper, Manganese, Potassium, Sodium, Vanadium and Zinc. Positive results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification as estimated values (J). The concentrations of Total Sodium in samples OW-17 and OW-48 were significantly greater than interference level and did not require The concentration levels of Total Calcium suspected qualification. Iron Total also produced suspected negative interferences with Antimony and Cadmium. Positive results for these analytes required qualification as estimated values Non-detected results for these analytes required qualification as estimated detection limits (UJ).

The concentrations of Total Calcium in samples OW-42 and OW-50 (SDG 000613) were greater than 50% of their respective levels in the Interference Check Samples (ICSA). concentrations produced suspected positive interferences with Beryllium, Copper, Manganese, Potassium, Sodium, Vanadium and Positive results less than or equal to the suspected interference levels required qualification as undetected (U) at the concentration originally reported. Positive results greater than the suspected interference levels required qualification as estimated values (J). The concentration of Total Zinc in sample OW-50 was significantly greater than the did interference level and not suspected The concentration levels of Total Calcium qualification. also produced suspected negative interferences with Antimony Positive results for these analytes required qualification as estimated values (J). Non-detected results these analytes required qualification as estimated detection limits (UJ).

#### 2.6 Matrix Spike Recoveries

Seven (7) primary samples (OW-48A (filtered and unfiltered) OW-18A (filtered and unfiltered) OW-42 (filtered) OW-44 (unfiltered) and OW-44 (filtered for Mercury only) were used for Matrix Spike (MS) analysis. There were several analytes which did not meet the Contract Required Recovery criteria as specified in the SOW and the QAPjP. The actions resulting from the assessment of the MS data for filtered samples apply to all of the filtered samples for this task. The actions resulting from the assessment of the MS data for unfiltered samples apply to all of the unfiltered samples for this task.

Samples OW-42 and OW-44 were not designated for MS analysis by the sampler. It was determined by the Laboratory that additional MS samples were required to meet analytical batch QC requirements and the analysts chose to use these samples.

The MS recovery of Dissolved Selenium for OW-18A was greater than 125%. The MS recoveries of Dissolved Selenium for OW-48A and OW-42 and Dissolved Mercury for OW-18A were less than 75% but greater than 30%. The positive results for Dissolved Selenium and Dissolved Mercury in the unfiltered samples required qualification as estimated values (J). The non-detected results for Dissolved Selenium and Dissolved Mercury in the unfiltered samples required qualification as estimated quantitation limits (UJ).

The MS recoveries of Total Selenium for OW-48A and OW-44 and Total Lead and Total Mercury for OW-18A were less than 75% but greater than 30%. The positive results for Total Selenium, Total Lead and Total Mercury in the unfiltered samples required qualification as estimated values (J). The

#### 2.9 Furnace Atomic Absorption Results

Total Arsenic analysis by Graphite Furnace Atomic Absorption (GFAA) was performed for all samples except OW-47, OW-43, OW-37, OW-45 and OW-12 which were analyzed by ICP. The post digestion spike recoveries for the remaining samples met the 85%-115% criteria.

Samples OW-46, OW-46DUP, OW-17, OW-38, OW-40 and OW-48 required analysis for Total Arsenic using the Method of Standard Addition (MSA). All criteria for MSA analysis were achieved.

Dissolved Arsenic analysis by GFAA was performed for all samples except OW-47, OW-43, OW-37, OW-45 and OW-12 which were analyzed by ICP. The post digestion spike recoveries for OW-22, OW-44 and O2EQB did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values.

Samples OW-46, OW-46DUP, OW-17, OW-14 and OW-48 required analysis for Dissolved Arsenic using MSA. All criteria for MSA analysis were achieved.

Total Selenium analysis by GFAA was performed for all samples. The post digestion spike recoveries for OW-46, OW-46DUP, OW-9, OW-17, OW-38, OW-48, OW-48A, OW-18A, OW-37, OW-50A, OW-18, OW-49, OW-49DUP, OW-44, OW-50 and OW-49A did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values. The non-detected results for this analyte required qualification as estimated detection limits.

Samples OW-14, OW-40, OW-43 and OW-45 required analysis for Total Selenium using MSA. All criteria for MSA analysis were achieved.

Dissolved Selenium analysis by GFAA was performed for all samples. The post digestion spike recoveries for OW-46, OW-46DUP, OW-9, OW-17, OW-38, OW-48, OW-48A, OW-18A, OW-47, OW-50A, OW-18, OW-22, OW-49DUP, OW-44, OW-42, OW-50 and OW-49A did not meet the 85%-115% criteria. The positive results for this analyte required qualification as estimated values. The non-detected results for this analyte required qualification as estimated detection limits.

Samples OW-14, OW-40 and OW-43 required analysis for Dissolved Selenium using MSA. All criteria for MSA analysis were achieved.

#### 2.11 Detection Limit Results

All criteria for Instrument Detection Limits and Reporting Requirements were met by the Laboratory.

#### 2.12 Sample Results

All sample results were within the linear range for ICP analysis and within the calibration range for Graphite Furnace Atomic Absorption analysis and Mercury analysis.

#### TABLE 1 (continued)

### CLP Sample Point Identifications for PDI Arsenic Pit/Chromium Lagoon Groundwater Investigation Samples

#### Total Metals

Sample Point ID	ETC ID	SDG.
OW-14	CA6450	000600
OW-17	CA6451	000600
01EQB	CA6452	000600
OW-38	CA6453	000600
OW-48	CA6454	000600
OW-48A	CA6455	000600
OW-48AMS	CA6455MS	000600
OW-48AMSD	CA6455MSD	
OW-40	CA6458	000600
OW-46	CA6459	000600
OW-46DUP	CA6460	000600
OW-9	CA6461	000600
OW-47	CA6462	000612
OW-43	CA6463	000612
OW-37	CA6464	000612
OW-22	CA6465	000612
OW-50A	CA6466	000612
OW-18	CA6468	000612
OW-18A	CA6469	000612
OW-18AMS	CA6469MS	000612
OW-18AMSD	CA6469MSD	
OW-45	CA6471	000612
OW-44	CA6472	000613
OW-49	CA6473	000612
OW-49DUP	CA6474	000612
OW-12	CA6475	000613
OW-42	CA6476	000613
OW-50	CA6565	000613
OW-49A	CA6566	000613
02EQB	CA6594	000613

# APPENDIX G Non-CLP Data Assessment

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

## ASSESSMENT OF OVERALL DATA QUALITY FOR TASK 37

		YES/NO/
1.	Were the QAPjP, laboratory reports, and field documentation available to support data assessment procedures?	ves
2.	Precision:	
	Are DCS RPD within control limits? Are lab duplicate RPD within control limits? Are field duplicate RPD within control limits? Are MS/MSD RPD within control limits? Overall assessment of precision @ Not in all case Assessment of Laboratory Performance form for partius Overall, the precision of the measurements is acceptable task.	culars.
3.	Accuracy:	
	Is absolute recovery within control limits for DCS?	
	Is relative recovery within control limits for MS/MSD? Overall assessment of accuracy <u>@ Not in all cases</u> Assessment of Laboratory Performance form for particular the accuracy of the measurements is accept this task.	<u>yes@</u> ; refer t
4.	Is relative recovery within control limits for MS/MSD? Overall assessment of accuracy <u>@ Not in all cases</u> Assessment of Laboratory Performance form for particologically, the accuracy of the measurements is acceptable.	<u>yes@</u> ; refer t
4.	Is relative recovery within control limits for MS/MSD?  Overall assessment of accuracy <u>@ Not in all cases Assessment of Laboratory Performance form for particular of the measurements is accept this task.</u> Representativeness:  Were procedures in the FSP followed?  If not, were procedural variations approved and documented?	<u>yes@</u> ; refer t
4.	Is relative recovery within control limits for MS/MSD?  Overall assessment of accuracy <u>@ Not in all cases Assessment of Laboratory Performance form for partic Overall, the accuracy of the measurements is accept this task.</u> Representativeness:  Were procedures in the FSP followed?  If not, were procedural variations approved	yes@ ; refer t culars. able for yes
4.	Is relative recovery within control limits for Ms/MSD?  Overall assessment of accuracy <u>@ Not in all cases Assessment of Laboratory Performance form for particular Overall, the accuracy of the measurements is accept this task.</u> Representativeness:  Were procedures in the FSP followed?  If not, were procedural variations approved and documented?  Were sample preservation procedures given in the FSP followed?  Were data reported in the proper units?  Was blank contamination not evident or well	yes@ refer t culars. able for  yes  N/A  yes  yes
4.	Is relative recovery within control limits for MS/MSD?  Overall assessment of accuracy <u>@ Not in all cases</u> Assessment of Laboratory Performance form for particular overall, the accuracy of the measurements is accept this task.  Representativeness:  Were procedures in the FSP followed?  If not, were procedural variations approved and documented?  Were sample preservation procedures given in the FSP followed?  Were data reported in the proper units?  Was blank contamination not evident or well documented at low levels?  Were field duplicates within control limits?	yese refer t culars. able for  yes N/A yes yes yes no@
4.	Is relative recovery within control limits for MS/MSD?  Overall assessment of accuracy <u>@ Not in all cases Assessment of Laboratory Performance form for particular overall, the accuracy of the measurements is accept this task.</u> Representativeness:  Were procedures in the FSP followed?  If not, were procedural variations approved and documented?  Were sample preservation procedures given in the FSP followed?  Were data reported in the proper units?  Was blank contamination not evident or well documented at low levels?	yes@ refer toulars. able for  yes  N/A  yes  yes  no@ all case for

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

## ASSESSMENT OF LABORATORY PERFORMANCE FOR TASK 37

LABC	PRATORY: <u>ETC Corp./ Chyun Associates</u> REPORT #: <u>00060</u>	<u>0, 612, 613</u>
VALI	DATED BY: Lori Anne Hendel Lory July 8, 19	91
		YES/NO/NA
1.	Release authorization with signature present?	yes
2.	Sample identification summary/description present?	N/A
3.	Analytical results present, including:	yes
	correct units? detection limits?	yes yes
	method used? date sampled?	<u>yes</u> yes
	date received?	<u>yes</u> <u>yes</u>
	date prepared?	yes
	date analyzed?	yes
	dilutions noted?	yes
4.	Holding times met?	yes*_
5.	Lab duplicate RPDs within control limits (20%)?	yes^
	Field duplicate RPDs within control limits (30%)?	no^^
6.	MS/MSD % recoveries within control limits (75-125%)?	yes#
7.	MS/MSD RPDs within control limits (30%)?	yes##
8.	Duplicate control sample (DCS) accuracy within given control limits (80-120%)? (Blank Spikes)	yes@
9.	DCS precision within given control limits (20%)?	yes@@
10.	Method blanks "clean"?	<u>yes</u>
11.	Chain-of-Custody present and complete with signatures and dates?	yes
12.	Name of analyst/supervisor given?	yes
13.	Procedural deviations noted?	yes
14.	QC procedures given?	N/A

#### INDUSTRI-PLEX PRE-DESIGN INVESTIGATION

# ASSESSMENT OF FIELD PERFORMANCE FOR TASK 37

SAMI	PLER/ORGANIZATION: <u>Michael J. Zarenski (Golder)</u> REPORT # <u>Stephen A. Wheeler (Golder)</u>	612, 613
VAL	DATED BY: Lori Anne Hendel   oc. Alechide DATE: Jul	y 8, 1991
		YES/NO/NA
1.	Does field documentation include:	
	date/time samples collected?	yes
	sample location?	yes
	name of sampler?	yes
	field measurements?	yes
	sampling method?	yes
	instruments/methods for field measurements?	yes
	calibration/maintenance of field instruments?	no^
	sampling containers used (COC*)?	<u>ves</u>
	sample preservation procedures (see COC*)?	yes
	Chain-of-Custody procedures?	yes
	field quality control procedures?	yes
2.	Were procedures in the Field Sampling Plan followed?  If not, were procedural variances approved and	yes
	documented?	N/A
3.	Was contamination of field blank samples not	
	evident, or well documented at low levels?	yes+
4.	Are field duplicates within control limits?	no=
5.	Comments: ^ Per the instructions of the Task Manager,	Redox
	Potential (Eh) was measured using an ORP Probe which was not	
	calibrated daily, pH and specific conductivity me	ters were
	properly calibrated on a daily basis.	
	+ Low level metals were detected in the equipment blan	
	<u>Ammonia and Total Kjeldahl Nitrogen at 3.7 mg/l each</u>	, and Tota
	Dissolved Solids at 56 mg/l.	<u> </u>
	= Field Duplicate RPDs were out-of-control for the fol	lowing:
	OW-46 - TOC (108%)	
	OW-49 - Ammonia (62%) and Total Kjeldahl Nitrogen	(101%)

^{*} Chain-of-Custody Form